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## A REVISION OF BLACK FLIES OF THE GENUS *TAENIOPTERNA* ENDERLEIN, 1925 (DIPTERA: SIMULIIDAE) FROM THE FUND COLLECTION OF THE ZOOLOGICAL INSTITUTE OF THE RUSSIAN ACADEMY OF SCIENCES

**A.V. Yankovsky**

Zoological Institute of the Russian Academy of Sciences, Universitetskaya Emb. 1, 199034 Saint Petersburg, Russia;  
e-mail: alekyank@zin.ru

### ABSTRACT

As a result of the examination of the fund collection of black flies (Diptera: Simuliidae) of the Zoological Institute of the Russian Academy of Sciences, a detailed re-descriptions and original drawings of 12 species (of 13 known in the world fauna) of the genus *Taeniopterna* Enderlein, 1925 (all known Palaearctic species of this genus) are given, 2 species are described as a new species, pupa of 1 species, male and female of 1 species are described for the first time, 1 former subspecies is treated as the separate species. Key to all 13 species of the genus *Taeniopterna* is provided.

**Key words:** black flies, morphology, Simuliidae, systematics, *Taeniopterna*

## РЕВИЗИЯ МОШЕК РОДА *TAENIOPTERNA* ENDERLEIN, 1925 (DIPTERA: SIMULIIDAE) ИЗ ФОНДОВОЙ КОЛЛЕКЦИИ ЗООЛОГИЧЕСКОГО ИНСТИТУТА РОССИЙСКОЙ АКАДЕМИИ НАУК

**А.В. Янковский**

Зоологический институт Российской Академии Наук, Университетская наб. 1, 199034 Санкт-Петербург, Россия;  
e-mail: alekyank@zin.ru

### РЕЗЮМЕ

В результате ревизии фондовой коллекции мошек (Diptera: Simuliidae) Зоологического института Российской академии наук сделаны подробные переописания и оригинальные рисунки деталей строения 12 (из 13 известных в мировой фауне) видов рода *Taeniopterna* Enderlein, 1925 (всех известных в Палеарктике видов этого рода), 2 вида описаны как новые для науки, для 1 вида впервые описана куколка, для 1 вида впервые описаны самец и самка, 1 подвид рассматривается как отдельный вид. Приведен определительный ключ для всех 13 видов рода *Taeniopterna*.

**Ключевые слова:** морфология, мошки, систематика, Simuliidae, *Taeniopterna*

### INTRODUCTION

The tribe Prosimuliini (as it treated by Rubzov and Yankovsky 1984, Yankovsky 1993, 1996, 2002, and with some admissions by Crosskey and Howard 1997) traditionally and reasonably is considered as the most archaic morphological group of the family Simuliidae (also taking into account the fossil

known data on the family). It seems that from the basic characters of this tribe the origin of the following variants of the morphology of all the other more advanced groups of black flies can be traced. Thus the systematics of this tribe (on the generic and the subgeneric level) is of certain importance. The subfamily Parasimuliinae, having, of course, many very archaic characters (often more archaic than the ones

in Prosimuliini) however seems to be the derived branch, which had bifurcated from the main stem in the early stage of simuliid evolution, and have not any descendants now.

The genus name *Taeniopterna* with the type species *Melusina macropyga* Lundström, 1911 had been proposed by Enderlein (1925). Later this taxon was considered by many authors as the separate species group *macropyga* in the genus *Prosimulium* Roubaud, 1906 (Rubzov 1956; Crosskey and Howard 1997; Adler et al. 2004; Adler and Crosskey 2009; and others). Even R.W. Crosskey, who ever has the tendency to consolidate the taxonomic groups of black flies, namely genera and subgenera, never had any doubt about the separate status of this group (at least on the level of the species group *macropyga* in the subgenus *Prosimulium* of the genus *Prosimulium*). Peterson (1970) and then Crosskey and Howard (1997) united in the genus *Prosimulium* s.l. four subgenera – *Distosimulium* Peterson, 1970, *Helodon* Enderlein, 1921, *Parahelodon* Peterson, 1970 and *Prosimulium* Roubaud, 1906 s.str. In the paper of Crosskey and Howard (1997) the subgenus *Prosimulium* included 3 species groups – *aculeatum*, *hirtipes / mixtum* and *macropyga*. But later, in the paper of Adler and Crosskey (2009), *Helodon* just had been treated as the separate genus (with 3 subgenera – *Distosimulium*, *Helodon* and *Parahelodon*); in this variant of the classification the genus *Prosimulium* included 3 species groups – *hirtipes*, *magnum* (earlier the part of *hirtipes / mixtum* species group) and *macropyga*. The species group *aculeatum* of the genus *Prosimulium* in this paper just had been considered as the separate genus *Urosimulium* Contini, 1963 – earlier (Crosskey and Howard 1997) it was only the species group in the subgenus *Prosimulium* (*Prosimulium*). Hence the tendency of rising of the rank of the subgenera and of the species groups in the former genus *Prosimulium* s.l. can be traced evidently.

It seems clear that the differences between the representatives of the species group *macropyga* and the differences between the remaining species groups of *Prosimulium* s.str. (*hirtipes* and *magnum*) are no lesser than the differences between the other genera (or subgenera in the treatment of Crosskey and Howard 1997) earlier united in the genus *Prosimulium* s.l., so the species group *macropyga* rather ought to be considered as the separate genus *Taeniopterna* Enderlein, 1925 (Yankovsky 2006, 2008). The genera *Distosimulium* Peterson, 1970, *Helodon* Enderlein,

1921 and *Parahelodon* Peterson, 1970 also are treated here as the separate genera (not as the subgenera in the paper by Crosskey and Howard 1997), and with the genera *Prosimulium* Roubaud, 1906, *Taeniopterna* Enderlein, 1925 and *Urosimulium* Contini, 1963 consist the tribe Prosimuliini Enderlein, 1921 of the subfamily Prosimuliinae Enderlein, 1921.

Of very interest are the data on the triploidy of some species of *Taeniopterna*, for example, of the parthenogenetic species *T. ursina* (Edwards, 1935) and of the very likely parthenogenetic species *T. pamirica* (Chubareva et Petrova, 1983). The shape of the anal sclerite of larvae of the species *T. ursina* (Edwards, 1935) and *T. ventosa* (Rubzov, 1956) is peculiar for the simuliids at all – it consists of 5 branches (as in the genus *Levitinia* Chubareva et Petrova, 1981 from the tribe Gymnopaidini Rubzov, 1955, this genus includes only 3 species in the World fauna). This character also connects the genus *Taeniopterna* first of all with the genus *Levitinia*, than with the genus *Gymnopais*, also having triploid species (Wood 1978, Adler et al. 2004), and permit to consider the genus *Taeniopterna* as the very possible ancestor of the evolutionary line toward the genus *Levitinia* Chubareva et Petrova, 1981, through the genus *Twinnia* Stone et Jamnback, 1955, and to the genus *Gymnopais* Stone, 1949 as the morphological perfection of this line. There is not 5-branched anal sclerite in Nearctic larval specimens of *T. ursina* (Adler 2011, private message), but both larvae examined from Europe as the type locality of the species, 1 from Norway and 1 from Kol'skiy Peninsula (see Fig. 19G) have the anal sclerite, distinctly consisted with 5 branches (may be we are dealing with two separate species?).

## MATERIAL AND METHODS

The material examined includes 216 specimens of 12 species of the genus *Taeniopterna* Enderlein, 1925: males, females, larvae and pupae of *T. kolymensis* (Patrusheva, 1975), *T. korshunovi* (Patrusheva, 1975), *T. macropyga* (Lundström, 1911 and *T. ventosa* (Rubzov, 1956), males, females and pupae of *T. erythronota* (Rubzov, 1956), males and females of *T. tiksi* Yankovsky sp.n., females, larvae and pupae of *T. ursina* (Edwards, 1935), males of *T. zaitzevi* (Rubzov, 1956) and *T. nenetz* Yankovsky sp.n., larvae and pupae of *T. arctica* (Rubzov et Carlsson, 1965), *T. pamirica* (Chubareva et Petrova, 1983) and *T. tredecimfistulata* (Rubzov, 1956). For the majority of

these species (excluding *T. kolymensis*, *T. korshunovi*, *T. macropyga*, and *T. ursina*) the type series were investigated.

**Institutional abbreviations.** BISB – Biological Institute of the Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia.

ZIN – Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia;

All the differences between several characters of some species in the former original descriptions (mainly published by Rubzov 1956) and in the analogous characters in the re-descriptions given here ought to be considered as the true recent additional data, because these differences are the result of the checking of the morphology of the specimens (as a rule with using of the type series) of the collection of ZIN. In the square brackets the literature data used and sometimes the recent decipherment of the author's labels are given (some important details are absent in the slides or in the pinned material available). Only the characters of larvae of last instar with completely developed pupal gill histoblasts are used. The descriptions and drawings sometimes might be partly incomplete, because they are based only on the material of the collection of ZIN (the slides and the pinned exemplars of several specimens persist now in very different conditions).

## SYSTEMATICS

### Family Simuliidae Newman, 1834

#### Subfamily Prosimuliinae Enderlein, 1921

#### Tribe Prosimuliini Enderlein, 1921

**Type-genus.** *Prosimulium* Roubaud, 1906, by original designation.

**Genera included.** *Baisomyia* Kalugina, 1991 (fossil), *Distosimulium* Peterson, 1970, *Gydarnia* Kalugina, 1991 (fossil), *Helodon* Enderlein, 1921 (syn.: *Ahaimophaga* Rubzov et Chubareva, 1977 (unav.), *Ahaimophaga* (*Haimophaga*) Rubzov, 1977, *Ahaimophaga* Chubareva et Rubzov in: Chubareva, 1978), *Kovalevymia* Kalugina, 1991 (fossil), *Parahelodon* Peterson, 1970, *Prosimulium* Roubaud, 1906 (syn.: *Mallochella* Enderlein, 1930, *Mallochianella* Vargas et Diaz Najera, 1948), *Simulimima* Kalugina in: Kalugina et Kovalev, 1985 (fossil), *Taeniopterna* Enderlein, 1925 (syn.: *Hellichia* Enderlein, 1925, *Piezosimulium* Peterson, 1989), *Urosimulium* Contini, 1963.

### Key to genera of the tribe Prosimuliini (fossil genera are not included)

#### Male

1. Hypopyge enormous large, with conical dorsal posterior projection on tergite IX ..... *Taeniopterna* Enderlein, 1925
- Hypopyge not enlarged, without dorsal projection on tergite IX ..... 2
2. Between eyes narrow but distinct haired frons; gonostyli shoe-like, with large distal heel ..... *Urosimulium* Contini, 1963
- Eyes holoptic; gonostyli conical, without distal heel ... 3
3. Anterior edge of ventral plate protruded as very long weakly sclerotized tubular or trough-like apodeme ..... *Parahelodon* Peterson, 1970
- Anterior edge of ventral plate without apodeme ..... 4
4. Ventral plate H-shaped, with very deep rectangular cleft on posterior edge ... *Distosimulium* Peterson, 1970
- Ventral plate without deep rectangular cleft on posterior edge ..... 5
5. Ventral plate distinctly flattened, without or with very slightly developed median keel; gonopleurites not jointed with arms of ventral plate ..... *Helodon* Enderlein, 1921
- Ventral plate as a rule not flattened, of horse-shoe shape, with distinct triangular median keel; gonopleurites jointed with arms of ventral plate ..... *Prosimulium* Roubaud, 1906

#### Female

1. Hypogynal valves markedly elongated and narrowed, as a rule tapered distally ..... 2
- Hypogynal valves relatively short and rounded distally ..... 3
2. Proboscis shortened, 1.5 times as short as clypeus, mouthparts not of bloodsucking type (except *T. erythronota* with haematophagous mouthparts); spermatheca very small, diameter  $\frac{1}{3}$  or less of length of branch of genital fork ..... *Taeniopterna* Enderlein, 1925
- Proboscis not shortened, about equal in length to clypeus, mouthparts of bloodsucking type (with rare exceptions); diameter of spermatheca about equal to length of branch of genital fork ... *Prosimulium* Roubaud, 1906
3. Spermatheca enormous large, weakly pigmented, diameter equal or more than whole length of genital fork .... *Distosimulium* Peterson, 1970
- Spermatheca not so large, distinctly pigmented, diameter about equal to length of branch of genital fork ... 4
4. Cerci large, elongated, curved upward and tapered distally ..... *Urosimulium* Contini, 1963
- Cerci short and rounded distally ..... 5
5. Antennae always of 11 segments; wings elongated and slightly tapered distally ..... *Helodon* Enderlein, 1921

- Antennae of 9–11 segments; wings wide and rounded distally ..... *Parahelodon* Peterson, 1970

#### Larva

- 1. Hypostomal teeth (excluding median tooth) widened and weakly sclerotized, become shorter laterally, so that anterior edge of hypostoma seems rounded ..... *Distosimulium* Peterson, 1970
- Hypostomal teeth not widened, tapered and heavily sclerotized, median and lateral teeth larger than intermediate teeth, anterior edge of hypostoma not rounded ..... 2
- 2. Sclerotized distal plate of prothorax widened, with pair of distinct dorsoventral apodemes ..... 3
- Sclerotized distal plate of prothorax narrow, without dorsoventral apodemes ..... 4
- 3. Diameter of head capsule markedly lesser than middle body diameter, 5th (lateral) teeth of hypostoma distinctly longer than median tooth, lateral serration of median tooth disposed on same level or backwards of line of terminations of the most short of intermediate teeth ..... *Taeniopterna* Enderlein, 1925
- Diameter of head capsule about equal to middle body diameter; 5th teeth of hypostoma about equal in length to median tooth or slightly shorter, lateral serration of median tooth disposed on same level or some backwards of line of terminations of the most long of intermediate teeth ..... *Prosimulium* Roubaud, 1906
- 4. Median tooth of hypostoma longer or equal in length to the longest of lateral teeth ..... *Helodon* Enderlein, 1921
- Median tooth of hypostoma shorter or equal in length to the most short of lateral teeth ..... 5
- 5. Antennae markedly longer than fan stems; anal sclerite nearly rectangular, with very short wide tapered branches ..... *Parahelodon* Peterson, 1970
- Antennae about equal in length or shorter than fan stems; anal sclerite not rectangular, with long wide anterior and short narrow posterior branches ..... *Urosimulium* Contini, 1963

#### Pupa

- 1. Cocoon almost entirely (at least on  $\frac{1}{2}$ ) covers body of pupa ..... 2
- Cocoon usually covers part of abdomen, rarely covers abdomen and only posterior part of thorax of pupa ..... 3
- 2. Gills of 12–16 filaments .. *Taeniopterna* Enderlein, 1925
- Gills of 24–28 filaments .. *Distosimulium* Peterson, 1970
- 3. Gills of 16–50 dendritically branched filaments markedly swollen basally, or of 1–8 enormous swollen trunks or lobes covered with numerous (from 50 to 200 on each trunk or lobe) small filaments ..... *Helodon* Enderlein, 1921
- Gills of 9–24 dendritically branched filaments not swollen basally, without trunks or lobes covered with small filaments ..... 4

- 4. Gills of 9–16 thin long filaments, length of gills about equal or more than body length of pupa ..... *Parahelodon* Peterson, 1970
- Gills of 12–24 filaments, length of gills  $\frac{1}{2}$  or less than body length of pupa ..... 5
- 5. Gills of 12 filaments; cocoon covers only posterior end of abdomen ..... *Urosimulium* Contini, 1963
- Gills of 14–24 filaments; cocoon covers abdomen wholly and (in some species) posterior part of thorax .. *Prosimulium* Roubaud, 1906

#### Genus *Taeniopterna* Enderlein, 1925

*Taeniopterna* Enderlein, 1925: 203; Yankovsky 2006: 19; 2008: 227.

*Hellichia* Enderlein, 1925: 203. Type species *Hellichia latifrons* Enderlein, 1925 (= *Melusina macropyga* Lundström, 1911), by original designation.

*Piezosimulium* Peterson, 1989: 317. Type species *Piezosimulium jeanniniae* Peterson, 1989 (= *Prosimulium (Prosimulium) neomacropyga* Peterson, 1970), by original designation.

**Type-species.** *Melusina macropyga* Lundström, 1911, by original designation.

**Diagnosis.** *Imago.* Head narrower than thorax. Antennae dark, of 11 articles (in females of 1 species of 10 articles). Proboscis shortened, 1.5 times as short as clypeus (near as in tribe *Gymnopaidini*). Scutum wholly black or dark grey. Thorax distinctly arched. Wings elongated and slightly tapered distally, vein  $Rs$  bifurcated, veins  $R1$  and  $C$  with hairs only, basal radial cell  $\frac{1}{2}$  of wing length. Legs black, brown or partly dark-yellowish; calcipala and pedisulcus absent; fore basitarsi thin, cylindrical. Pleural membrane bare.

*Male.* Antennae relatively thin and long, of 11 articles, diameter of articles IV–X equal or more than length. Between eyes narrow but marked frons covered with hairs, frons distinctly widened near base of antennae. Hind basitarsus distinctly or moderately widened, from 2.7 to 4.0 times as long as wide. Hypopyge enormous large, with conical posterior dorsal projection on tergite IX; gonocoxites 1.3–2.0 times as long as gonostyli, rarely about equal in length to gonostyli. Gonostyli subtriangular, width at base 1.6–4.0 times width in distal part, length from slightly less to 1.6 times more than width at base, without heel, with 2–3 apical spines. Ventral plate usually flattened, can be moderately curved, but never of horse-shoe shape, as in the genus *Prosimulium*, width of body of

ventral plate from equal to twice more than length, median keel developed in different degree, or rarely absent, arms of ventral plate short or very long, thin and curved backward. Median sclerite, as a rule, not elongated, widely bifurcated distally, in several species elongated and curved backward. Gonopleurites elongated, without spines.

**Female.** Antennae of 11 articles, only in 1 species (*Taeniopterna ventosa*) of 10 articles. Mouthparts as a rule not of bloodsucking type (maxillar laciniae and mandibles without pointed teeth), only in 1 species (*T. erythronota*) of bloodsucking type. Claws simple or with small basal tooth. Abdominal sternites not reduced. Hypogynal valves elongated and often narrowed distally, with weakly or moderately sclerotized median edges, 1.3–2.0 times as long (rarely about equal in length) as VIII abdominal sternite. Stem of genital fork from 1.2 times shorter to 1.4 times longer than branches, branches with wide or tapered posteromedial apodemes, sclerotized anterolateral apodemes absent. Spermatheca very small, its diameter  $\frac{1}{3}$  or less length of branch of genital fork (the character not registered in all other Prosimuliinae), walls of spermatheca thick, pigmented, with distinct crumpled pattern and with large membranous area near beginning of duct. Cerci short, subrectangular or rounded distally.

**Larva.** Diameter of head capsule markedly lesser than middle body diameter. Pattern of frontoclypeal apotome as a rule positive (dark spots on pale background), in 2 species negative (pale spots on dark background). Antennae shorter than fan stems, only in 1 species (*Taeniopterna kolymensis*) about equal in length to stems. Primary fan of premandibles with 23–33 rays (except *T. pamirica* with 13–15 rays). Sclerotized distal plate of prothorax widened, with pair of distinct long dorsoventral apodemes. Lateral hypostomal teeth markedly longer than median tooth (median tooth curved upward), so that lateral serration of median tooth disposed on same level or backwards of line of terminations of the most short of intermediate teeth, all teeth conical. Postgenal cleft small or moderate size, with rounded or slightly tapered (1 species with rectangular) clear anterior edge. Preapical mandibular teeth I and II very small, several times smaller than preapical tooth III; inner mandibular teeth 8–18; mandibular serration saw-like, with 11–25 notches, in several species subdivided into 2 (anterior and posterior) groups. Anal sclerite short, as a rule of 4 branches, in 2 species

(*Taeniopterna ursina* and *T. ventosa*) of 5 branches as in genus *Levitinia* Chubareva et Petrova, 1981; near each upper branch stripe of numerous small thornlets. Posterior circlet of 64–98 rows with 9–14 hooklets in each row.

**Pupa.** Gills usually of 12 (*Taeniopterna tredecimfistulata*), 16 (*T. arctica* and *T. pamirica*) or 14 (all other species) dendritically diverged filaments, not swollen in basal part, length of gills about  $\frac{1}{3}$ – $\frac{1}{2}$  or rarely more than body length of pupa; angle between basal parts of upper and lower filaments 45–180°. Abdominal tergites V–IX with spine combs. Terminal spines thin, long, strait or smoothly curved. Cocoon unshaped, friable, covers all or most of pupal body.

**Distribution.** Holarctic.

**Species included.** *T. arctica* (Rubzov et Carlsson, 1965) (PA), *T. erythronota* (Rubzov, 1956) (PA), *T. kolymensis* (Patrusheva, 1975) (PA), *T. korshunovi* (Patrusheva, 1975) (PA), *T. macropyga* (Lundström, 1911) (syn.: *latifrons* (Enderlein, 1925)) (PA); *T. nenetz* Yankovsky, sp.n. (PA), *T. neomacropyga* (Peterson, 1970) (NA) (syn.: *jeanninae* (Peterson, 1989), *wui* (Peterson et Kondratieff, 1995)), *T. pamirica* (Chubareva et Petrova, 1983) (PA), *T. tiksi* Yankovsky, sp.n. (PA), *T. tredecimfistulata* (Rubzov, 1956) (PA), *T. ursina* (Edwards, 1935) (PA, NA), *T. ventosa* (Rubzov, 1956) (PA), *T. zaitzevi* (Rubzov, 1956) (PA) [PA – Palaearctic, NA – Nearctic].

**Remarks.** 3 species *Prosimulium candicans* Rubzov, 1956, *P. oligoaristatum* Rubzov, 1971 and *P. pecticrassum* Rubzov, 1956, earlier (Adler and Crosskey 2009) included into the species group *macropyga* (= *Taeniopterna*), do not belong to the genus *Taeniopterna* Enderlein, 1925 (in male hypopyge not enlarged, without projection on tergite IX; in female diameter of spermatheca about equal to length of branch of genital fork; in larva lateral teeth of hypostoma about equal in length to median tooth; in pupa cocoon partly covers body of pupa), and according to morphological characters belong to the genus *Prosimulium* Roubaud, 1906. The species *Prosimulium intercalare* (Rubzov, 1956), earlier (Adler and Crosskey 2009) included into the species group *macropyga* (= *Taeniopterna*), also does not belong to the genus *Taeniopterna* Enderlein, 1925 (in larva median tooth of hypostoma longer than the most long of lateral teeth; in pupa 16 dendritically branched filaments markedly swollen in basal part), and according to morphological characters belongs to the genus *Helodon* Enderlein, 1921.

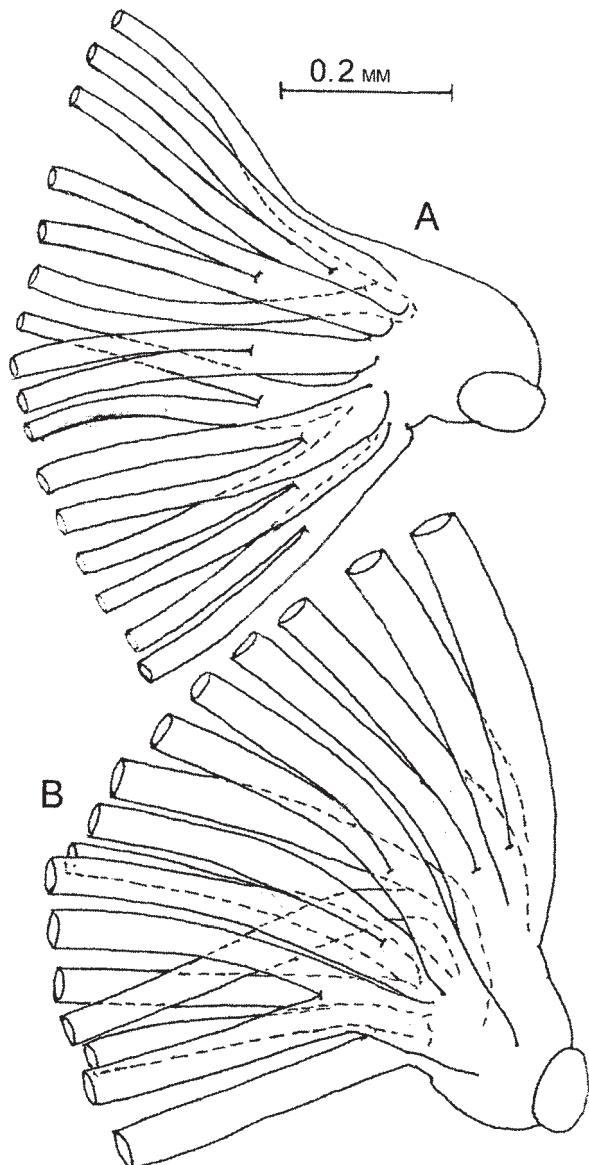
**1. *Taeniopterna arctica* (Rubzov et Carlsson, 1965)**

(Figs. 1, 2)

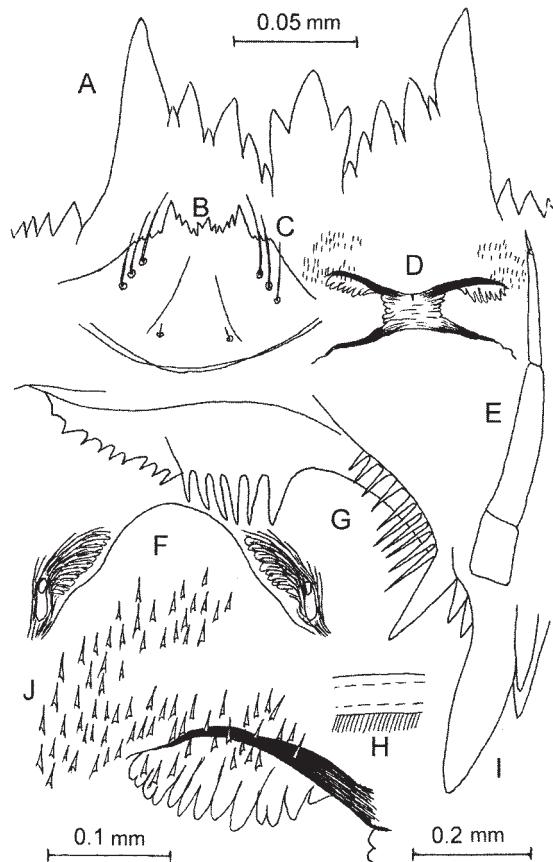
*Prosimulium macropyga arcticum* Rubzov et Carlsson, 1965:  
8, fig. 4.

**Description.** *Male and female unknown.*

*Larva.* [Head capsule dark yellowish brown, head pattern dark, moderately distinct (Rubzov, Carlsson



**Fig. 1. A –** *Taeniopterna arctica* (Rubzov et Carlsson, 1965). Basal part of pupal gill histoblast of larva (holotype). **B –** *Taeniopterna pamirica* (Chubareva et Petrova, 1983). Basal part of pupal gill histoblast of larva (holotype). Scale bar: 0.2 mm = A, B.



**Fig. 2. *Taeniopterna arctica* (Rubzov et Carlsson, 1965).** Larva (holotype): A – hypostomal teeth; B – hypostoma; C – sublateral setae on hypostoma; D – anal sclerite; E – antenna; F – postgenal cleft; G – mandibular serration; H – microtrichiae on rays of primary fan of premandibles; I – mandibular teeth; J – thornlets near anal sclerite. Scale bar: 0.2 mm = B, C, D, F; 0.1 mm = E; 0.05 mm = A, G, H, I, J.

1965: 8)]. Antennae shorter than stalks of premandibles; articles I+II twice as long as article III, article I about 4 times as short as article II, article II without additional wrinkles. Primary fan of premandibles with 24 rays, secondary fan with 15, median fan with 10–11 rays; primary fan rays with microtrichia of equal length,  $\frac{1}{2}$  of diameter of ray in middle part. Lateral hypostomal teeth V 1.5 times as long as median tooth, lateral teeth IV longer than III; each side of hypostoma with 3 sublateral setae. Postgenal cleft with rounded anterior edge, not covered with membrane, postgenal bridge about equal in length to hypostoma. Outer teeth of mandibles relatively long, apical tooth twice as long as outer teeth and twice as long as preapical tooth III, preapical tooth III 3

times as long as preapical teeth I and II; inner mandibular teeth 10; mandibular serration of 2 distinct groups – 6 relatively large notches arranged rather forward (towards apical tooth) and 8–9 relatively small notches arranged rather backwards. Anal sclerite short, upper and lower branches of equal length, posteriorly from upper branches areas with semi-transparent sclerotization; anterolaterally from each upper branch curved stripe of 70–75 simple thornlets arranged upward. Posterior circlet of 88 rows with 9–10 hooklets in each row, lower branches of anal sclerite extend as far as rows VI–VII.

**Pupa.** Gills of 16 dendritically diverged moderately thick dark filaments approximately equal in length and diameter, disposed on 8 short stems (stems 2–3 times as long as diameter); angle between basal parts of upper and lower filaments about 90°.

**Holotype.** Larva with pupal gill histoblasts (ZIN, slide 17491), [East Siberia], Taymyr peninsula, Dudinka District, Pokomokon River, 10 August 1962, coll. Z.V.Ussova.

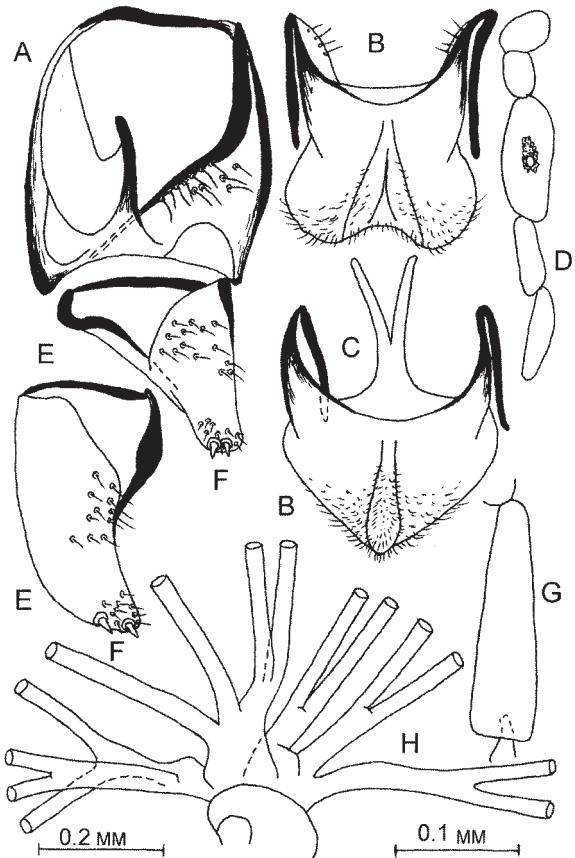
**Distribution.** East Siberia (Taymyr Peninsula) (Crosskey and Howard 1997; Yankovsky 2002).

## 2. *Taeniopterna erythronota* (Rubzov, 1956)

(Figs. 3, 4)

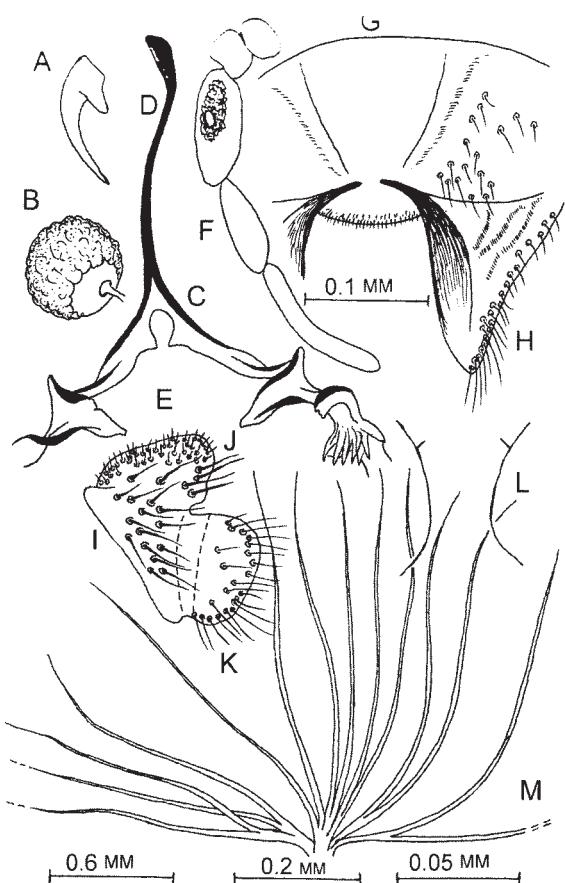
*Prosimulium erythronotum* Rubzov, 1956: 229, fig. 60; 1961: 163, fig. 59.

**Description. Male.** Length about 3 mm. Frons very narrow, with rare short brown hairs. Maxillar palpomere V twice as short as palpomeres III+IV. [Scutum black, with narrow anterior yellowish-brown stripe and with rare dimly-golden hairs; halter brownish black with yellowish brown anterior part; legs dark-brown (Rubzov, 1956: 229, 1961: 163)]. Hind basitarsus moderately widened, 4 times as long as wide. Gonocoxites 1.5–1.6 times as long as gonostyli, 1.2 times as long as wide, subcylindrical, not narrowed in distal part. Gonostyli subtriangular, distinctly narrowed distally, width at base 4 times width in distal part (ventral view), in ventral view length equal to width at base, apical spines 2, near apical spines 8–10 short setae. Body of ventral plate flattened, 1.3–1.5 times as wide as long, with distinct triangular median keel, arms very long, thin, curved backwards, distinctly sclerotized. Median sclerite very widened in basal part, length 5–7 times its least width, deeply bifurcated, branches narrow, not tapered.



**Fig. 3.** *Taeniopterna erythronota* (Rubzov, 1956). Male (holotype): (A–G): A – gonocoxite; B – ventral plate; C – median sclerite; D – maxillary palp; E – gonostylus; F – apical spines on gonostylus; G – hind basitarsus. Pupa: H – basal part of gill. Scale bar: 0.2 mm = D, G, H; 0.1 mm = A, B, C, E, F.

**Female.** Length 3.5–4.0 mm. Frons relatively narrow, its height 1.5 least width, with 40–45 sublateral hairs on each side and with several submedian hairs. Antennae brown. Mouthparts haematophagous; mandibles with  $24 \times 13$ , maxillar laciniae with  $16 \times 16$  teeth. Maxillar palpi brown, thin, palpomere V 1.3–1.4 times as short as palpomeres III+IV, sensory vesicle large, about  $\frac{1}{2}$  of length of palpomere III. Scutum dull black, with small brownish reddish humeral areas and with rare short silvery hairs; abdomen dark grey; veins, halteres and most of legs brown, tarsi black. Fore basitarsus slightly widened, 4–5 times as long as wide. Claws toothless. Hypogynal valves about equal in length to weakly sclerotized abdominal sternite VIII, valves narrow, tapered, widely spaced (distance between valves 1.5 width of valve in



**Fig. 4.** *Taeniopterna erythronota* (Rubzov, 1956). Female (A–L): A – claw; B – spermatheca; C – genital fork; D – stem of genital fork; E – posterior cleft of genital fork; F – maxillary palp; G – abdominal sternite VIII; H – hypogynal valve; I – anal lobe; J – spiniform setae on posterior blade of anal lobe; K – cercus; L – frons. Pupa: M – gill. Scale bar: 0.6 mm = M; 0.2 mm = F, L; 0.1 mm = B, C, D, E, G, H, I, J, K; 0.05 mm = A.

middle part), with numerous relatively thin hairs on lateral edges, median edges weakly sclerotized. Stem of genital fork slightly widened distally, 1.3–1.4 times as long as branches; branches with very widened distal parts, directed toward each other; posteromedial apodemes very small, tapered, disposed near beginning of branches; posterior cleft of genital fork (between branches) very wide (width 2.5 depth). Anal lobes subtriangular, 1.7 times as high and 2.7 times as long as cerci. Anal lobes 1.5 times, cerci 2.3 times as high as long, posterior blade of anal lobes with 35–40 small spiniform setae. Spermatheca rounded,  $\frac{1}{3}$  of length of branch of genital fork.

*Larva* unknown.

**Pupa** (first description). Body length 5.0–5.5 mm. Gills dark yellow to brown, slightly less than  $\frac{1}{2}$  of pupal body length, of 14 filaments approximately equal in length and diameter, disposed on 5 short stems, scheme of divergence 2+2+2+4+(2+2); angle between basal parts of upper and lower filaments about  $180^\circ$ .

**Holotype.** Male (ZIN, pinned, details in slide 2278 on same pin), [Khabarovsk Territory], Bolshaya Berendzhi River, 6 July 1936, coll. Snegirevskiy.

**Additional material.** 1 female (ZIN, pinned, details in slide 6794 on same pin), [Khabarovsk Territory], Teymey River (affluent of Lantar' River), 22 July 1936, coll. Snegirevskiy; 1 female (ZIN, pinned), [Khabarovsk Territory], Ayan near Okhotsk, 20 August 1936, coll. Snegirevskiy; 2 females (ZIN, slides 6886, 6888), 16 females (ZIN, pinned), [W Siberia], surroundings of Krasnoyarsk, 1952, coll. Kolomyets; 2 males with pupal exuviae (ZIN, slides 19662, 19710), Yakutia, Ust'-Yansk, Kular, Burgaat Spring, 4–7 August 1967, coll. E.I. Worobez.

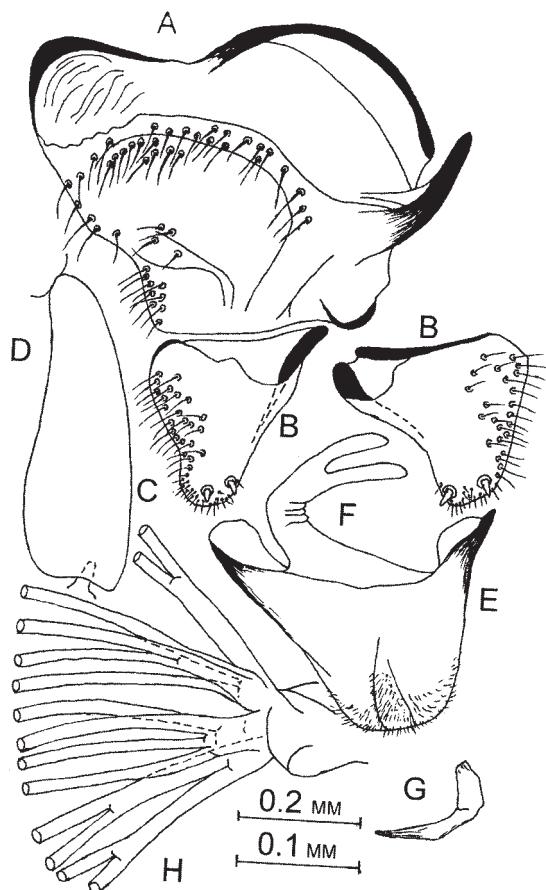
**Distribution.** E Siberia (Krasnoyarsk Territory), Russian Far East (Yakutia, Khabarovsk Territory) (Crosskey and Howard 1997; Yankovsky 2002).

**Remarks.** The body of the holotype male is absent on the pin, the characters of male color are given according to the description of Rubzov (1956, 1961). Pupae had been collected only in 1967 (E.I. Worobez) and were described here for the first time. Earlier (Yankovsky 2008) *erythronota* was excluded from the genus *Taeniopterna*, but the recent re-investigation has confirmed the belonging of *erythronota* to this genus, although there are some peculiar characters in this species (for example, hematophagous mouth-parts in female).

### 3. *Taeniopterna kolymensis* (Patrusheva, 1975) (Figs. 5–7)

*Prosimulium kolymensis* Patrusheva, 1975a: 65, figs. 1, 2; Bodrova 1981: 10, fig. 1; Boldarueva 1982: 76, fig. 1.

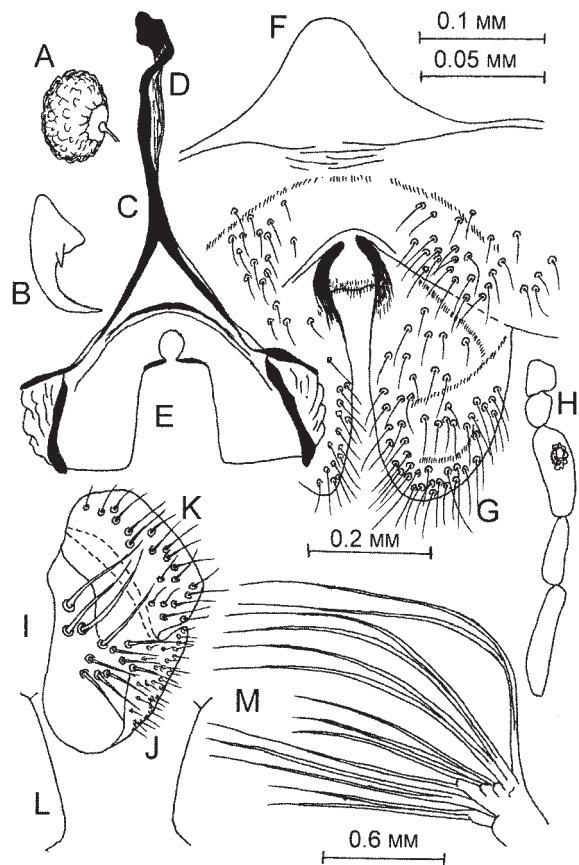
**Description. Male.** Length 4.0–4.5 mm. Body color generally dark. Frons narrow, with rare dark hairs. Hind basitarsus distinctly widened, 2.7–2.8 times as long as wide. Gonocoxites about twice as long as gonostyli, 1.2–1.4 times as wide as long, widened in basal part. Gonostyli subtriangular, moderately narrowed distally, width at base 2.5 times width in distal part (ventral view), in ventral view



**Fig. 5.** *Taeniopterna kolymensis* (Patrusheva, 1975). Male with pupal exuviae: A – gonocoxyte; B – gonostylus; C – apical spines on gonostylus; D – hind basitarsus; E – ventral plate; F – median sclerite; G – paramere; H – basal part of pupal gill. Scale bar: 0.2 mm = D, H; 0.1 mm = A, B, C, E, F, G.

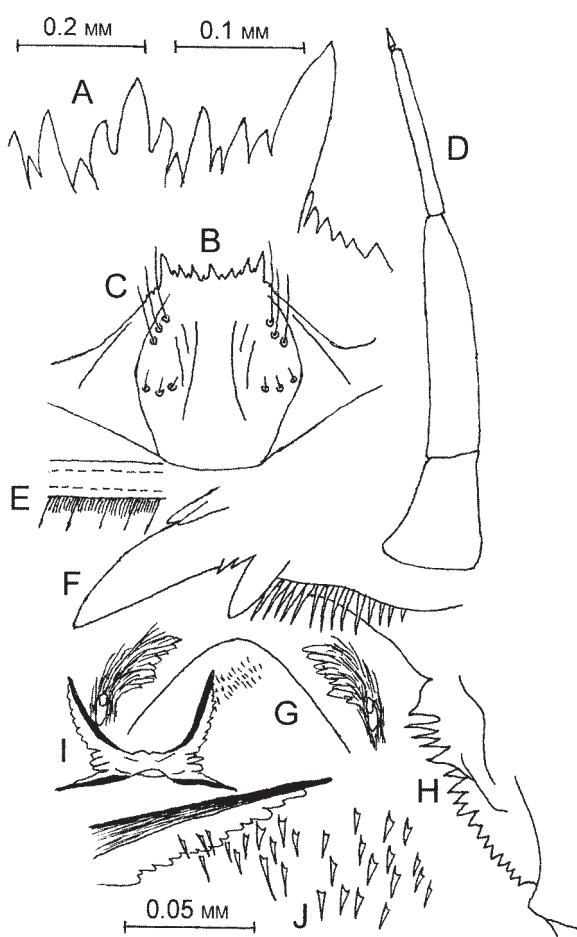
length 1.2 times less than width at base, apical spines 2, near apical spines 15–20 short setae. Body of ventral plate flattened, about twice as wide as long, with moderate triangular median keel, arms thick and short, not curved backwards, distinctly sclerotized. Gonopleurites as thin curved tapered elongate plates. Median sclerite very widened in basal part, elongated and curved backward, not deeply bifurcated distally, branches not tapered.

**Female.** [Length 4–6 mm (Bodrova 1981: 10; Boldarueva 1982: 76)]. Body color generally dark. Frons wide, its height equal to least width, with sparse short sublateral hairs and with several submedian hairs. Antennae dark brown. Mouthparts not of bloodsucking type. Maxillar palpi brown, thin,



**Fig. 6.** *Taeniopterna kolymensis* (Patrusheva, 1975). Female with pupal exuviae: A – spermatheca; B – claw; C – genital fork; D – stem of genital fork; E – posterior cleft of genital fork; F – abdominal sternite VIII; G – hypogynal valve; H – maxillary palp; I – anal lobe; J – spiniform setae on posterior blade of anal lobe; K – cercus; L – frons. Pupa: M – gill. Scale bar: 0.6 mm = M; 0.2 mm = H, L; 0.1 mm = A, C, D, E, F, G, I, J, K; 0.05 mm = B.

palpomere V 1.3–1.4 times as short as palpomeres III+IV, sensory vesicle small, about  $\frac{1}{4}$  of length of palpomere III. Fore basitarsus 6–7 times as long as wide. Claws with very small hardly distinguishable basal tooth. Hypogynal valves 1.6–1.7 times as long as wide in middle part, 1.3–1.4 times as long as weakly sclerotized subtriangular abdominal sternite VIII, not tapered, closely spaced (maximal distance between valves less than  $\frac{1}{4}$  width of valve in middle part), entirely covered with numerous long robust hairs, median edges moderately sclerotized. Stem of genital fork not widened but curved distally, 1.2–1.3 times as long as branches; branches moderately wid-



**Fig. 7.** *Taeniopterna kolymensis* (Patrusheva, 1975). Larva: A – hypostomal teeth; B – hypostoma; C – sublateral setae on hypostoma; D – antenna; E – microtrichiae on rays of primary fan of premandibles; F – mandibular teeth; G – postgenal cleft; H – mandibular serration; I – anal sclerite; J – thornlets near anal sclerite. Scale bar: 0.2 mm = B, C, G, I; 0.1 mm = D; 0.05 mm = A, E, F, H, J.

ened in distal part, posteromedial apodemes membranous, right-angled, widely spaced; posterior cleft of genital fork (between apodemes) of moderate width (depth 1.5 width). Anal lobes subtriangular, about equal in height and twice as long as cerci. Anal lobes 1.2 times, subrectangular cerci 2.3 times as high as long, posterior blade of anal lobes with 25–30 small spiniform setae. Spermatheca 1.5 times as wide as long,  $\frac{1}{3}$  of length of branch of genital fork.

**Larva.** [Length 7–8 mm, head capsule dark yellowish brown, body dirty grey (Patrusheva 1975a: 68)]. Head pattern hardly distinguishable, as pale

spots on dark background. Antennae subequal or slightly longer than stalks of premandibles, articles I+II 2.2–2.3 times as long as article III, article I twice as short as article II, article II without additional wrinkles. Primary fan of premandibles with 29–30 rays, secondary fan with 15–16, median fan with 10–11 rays; primary fan rays with microtrichia of 2 types: long (equal in length to diameter of ray in middle part), and short ( $\frac{1}{2}$  as long as diameter of ray). Lateral hypostomal teeth V 1.5 times as long as median tooth; lateral teeth IV shorter than III; each side of hypostoma with 3 sublateral setae. Postgenal cleft with rounded anterior edge, not covered with membrane, postgenal bridge 1.2 times as short as hypostoma. Outer teeth of mandibles very small and short, apical tooth 5 times as long as outer teeth and 3 times as long as preapical tooth III, preapical tooth III 3–5 times as long as preapical teeth I and II; inner mandibular teeth 13–14; mandibular serration of 2 distinct groups – 5 relatively large notches arranged rather forward (towards apical tooth) and 10–12 smaller notches not arranged forward. Anal sclerite short, upper branches arranged forward, 2 times as long as lower ones; laterally from each upper branch area with 25–30 simple thornlets arranged downward. Posterior circlet of 64 rows with 9 hooklets in each row, lower branches of anal sclerite extend as far as rows IV–V.

**Pupa.** Body length 3.5–4.0 mm. Gills dark yellow,  $\frac{1}{2}$  of pupal body length, of 14 filaments approximately equal in diameter, filaments VII–IX, XIII, XIV shorter than others, 2 upper filaments in  $\frac{1}{3}$  of length from base distinctly curved, filaments disposed on 3 short thick stems, scheme of divergence (2+2+2)+4+(2+2); angle between basal parts of upper and lower filaments about 90°.

**Material.** 1 female with pupal exuviae (ZIN, slide 21507), Maritime Territory, Krasnoarmeyskiy District, 1970, coll. Yu.D.Bodrova; 1 larva with pupal gill histoblasts (ZIN, slide 21508), Chukotka, near Lavrentiya, 9 August 1973, coll. Yu.D. Bodrova; 1 male with pupal exuviae (ZIN, slide 21509), same data.

**Distribution.** N Siberia (Yamal Peninsula), Russian Far East (Kolyma River Basin, Maritime Territory) (Crosskey and Howard 1997; Yankovsky 2002). Type locality: Upper Kolyma River Basin.

**Remarks.** Original description of the species *Taeniopterna kolymensis* includes males (extracted from pupae), larvae and pupae from the Basin of the Upper Kolyma River (Patrusheva 1975a). Later females

(extracted from pupae) of this species were described almost simultaneously – from the Maritime Territory (Bodrova 1981) and from the Yamal Peninsula (Boldarueva 1982); both descriptions and drawings are very similar. The type material of *T. kolymensis* is deposited in the collection of BISB. It was written in author's description (Patrusheva 1975a: 69), that "the part of paratypes is deposited in the collection of ZIN", but in this collection any material collected by Patrusheva is absent. In the re-description of all stages the material from the Chukotka and the Maritime Territory has been used. The color of imago is generally dark, but the details of pattern and color of hairs are unknown, because both males and females had been extracted from pupae.

#### 4. *Taeniopterna korshunovi* (Patrusheva, 1975) (Figs. 8–10)

*Prosimulium macropyga korshunovi* Patrusheva, 1975b: 507, figs. 1–4.

**Description. Male.** [Length 3.0–3.5 mm; scutum and abdomen black, with yellowish golden hairs; halters and legs light-brown (Patrusheva 1975b: 507)]. Frons relatively (for males) wide, with long dark hairs. Hind basitarsus distinctly widened, 2.7 times as long as wide. Gonocoxites 1.5 times as long as gonostyli, 1.3–1.4 times as wide as long, widened in basal part. Gonostyli subtriangular, moderately narrowed distally, width at base 2.5 times width in distal part (ventral view), in ventral view length 1.3 times more than width at base, apical spines 2, near apical spines 10–12 short setae. Body of ventral plate flattened, 1.7 times as wide as long, with moderate triangular median keel, arms thick and short, not curved backwards, distinctly sclerotized. Gonopleurites as subrectangular relatively wide elongate plates. Median sclerite very widened in basal part, elongated and curved backward, deeply bifurcated distally, branches not tapered. Cerci with 38–40 long hairs in distal part.

**Female.** [Length 2.5–3.5 mm, antennae brownish black; scutum and abdomen black, with rare golden hairs, veins yellow; halters and legs yellowish brown, tarsi black (Patrusheva 1975b: 508, 509)]. Frons wide, its least width more than height, with sparse short sublateral hairs and with several submedian hairs. Mouthparts not of bloodsucking type. Maxillary palpi dark-brown, palpomere V about equal in length

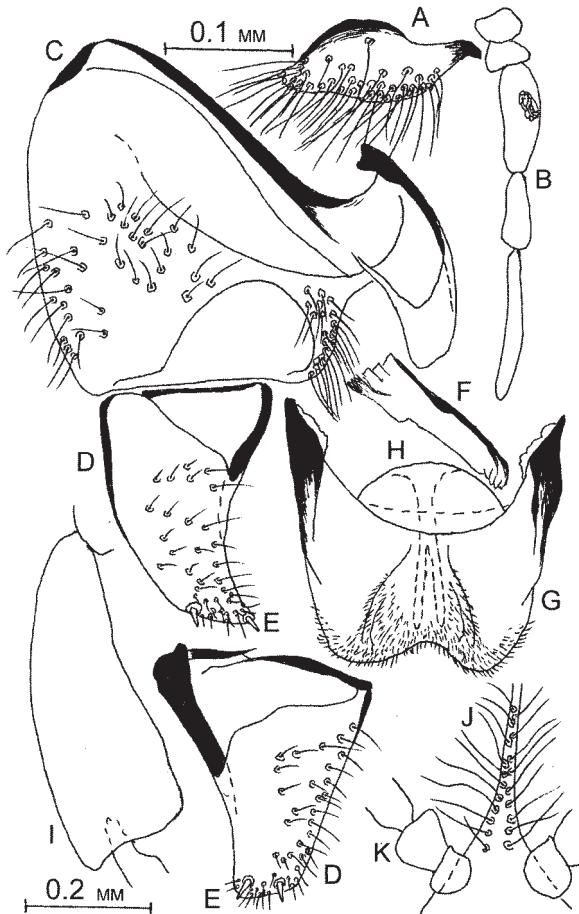
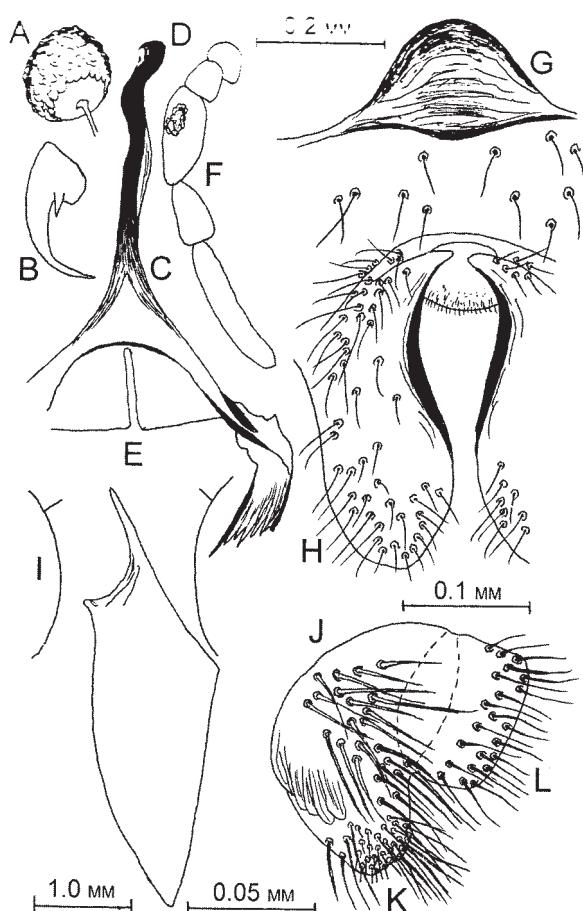


Fig. 8. *Taeniopterna korshunovi* (Patrusheva, 1975). Male: A – cercus; B – maxillary palp; C – gonocoxite; D – gonostylus; E – apical spines on gonostylus; F – paramere; G – ventral plate; H – median sclerite; I – hind basitarsus; J – frons; K – basal part of antenna. Scale bar: 0.2 mm = B, I, J, K; 0.1 mm = A, C, D, E, F, G, H.

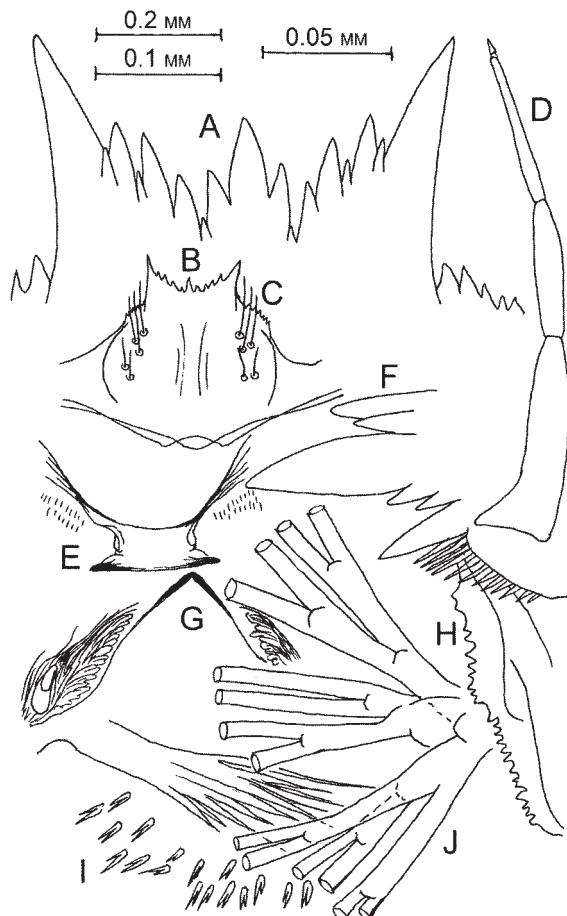
to palpomeres III+IV, sensory vesicle small, about  $\frac{1}{4}$  of length of palpomere III. Fore basitarsus 6–8 times as long as wide. Claws with small but clearly distinct basal tooth. Hypogynal valves elongated, 2.7 times as long as wide in middle part, 1.7 times as long as heavily sclerotized subtriangular abdominal sternite VIII, valves not tapered, moderately spaced (maximal distance between valves  $\frac{1}{2}$  width of valve in middle part), with long hairs in distal and lateral parts, median edges moderately sclerotized. Stem of genital fork not widened but curved distally, about equal in length to branches; branches slightly widened in distal part, posteromedial apodemes membranous, right-angled, closely spaced; posterior cleft of genital



**Fig. 9.** *Taeniopterna korshunovi* (Patrusheva, 1975). Female (A – L): A – spermatheca; B – claw; C – genital fork; D – stem of genital fork; E – posterior cleft of genital fork; F – maxillary palp; G – abdominal sternite VIII; H – hypogynal valve; I – frons; J – anal lobe; K – spiniform setae on posterior blade of anal lobe; L – cercus. Pupa: M – cocoon. Scale bar: 1.0 mm = M; 0.2 mm = F; 0.1 mm = A, C, D, E, G, H, J, K, L; 0.05 mm = B.

fork (between apodemes) as narrow chink. Anal lobes suboval, 1.7–1.8 times as high and 1.8 times as long as cerci. Anal lobes twice, subrectangular cerci twice as high as long, posterior blade of anal lobes with 15–17 small spiniform setae. Spermatheca rounded,  $\frac{1}{3}$  of length of branch of genital fork.

**Larva.** [Length 7–11 mm; head capsule brown, body light-brown (Patrusheva 1975b: 510)]. Head pattern dark, distinct. Antennae distinctly shorter than stalks of premandibles, articles I+II 2.3 times as long as article III, article I 1.3–1.4 times as long as article II, article II without additional wrinkles. Pri-



**Fig. 10.** *Taeniopterna korshunovi* (Patrusheva, 1975). Larva with pupal gill histoblasts: A – hypostomal teeth; B – hypostoma; C – sublateral setae on hypostoma; D – antenna; E – anal sclerite; F – mandibular teeth; G – postgenal cleft; H – mandibular serration; I – thornlets near anal sclerite; J – basal part of pupal gill histoblast. Scale bar: 0.2 mm = B, C, E, G, J; 0.1 mm = D; 0.05 mm = A, F, H, I.

mary fan of premandibles with 27–33 rays, secondary fan with 18–20, median fan with 16–17 rays; primary fan rays with microtrichia of 2 types: long (equal in length to diameter of ray in middle part), and short ( $\frac{1}{2}$  as long as diameter of ray). Lateral hypostomal teeth V more than 2 times as long as median tooth, lateral teeth IV longer than III; each side of hypostoma with 5 sublateral setae. Postgenal cleft triangular with obtuse anterior edge, not covered with membrane, postgenal bridge 1.5 times as short as hypostoma. Outer teeth of mandibles of moderate length, apical tooth 2.5 times as long as outer teeth and as preapi-

cal tooth III, preapical tooth III 2.5 times as long as relatively large preapical teeth I and II; inner mandibular teeth 11–13; mandibular serration of 20–25 small notches of irregular shape arranged in simple line, first notch not larger than others. Anal sclerite moderately short, upper branches 4 times as long as lower ones; posterolaterally from each upper branch stripe of 15–17 relatively large bifurcated thornlets arranged downward. Posterior circlet of 68–74 rows with 10–11 hooklets in each row, lower branches of anal sclerite extend as far as rows V–VI.

**Pupa.** Body length 3.5–5.0 mm. Gills yellow,  $\frac{1}{2}$  of pupal body length, of 14 filaments approximately equal in length and diameter, filaments disposed on 3 short thick stems, scheme of divergence  $(2+2)+(2+2)+[(2+2)+2]$ ; angle between basal parts of upper and lower filaments about  $90^\circ$ . Cocoon shoe-shaped.

**Material.** 2 larvae with pupal gill histoblasts (ZIN, slides 19663, 21048), Polar Ural, Kharp, Sob' River, 9 August 1968, coll. Yu. Korshunov; 1 male with pupal exuviae (ZIN, slide 21049), 1 female (ZIN, slide 21050), Polar Ural, spring near Kharp, 10–12 August 1968, coll. Yu. Korshunov; 2 larvae with pupal gill histoblasts (ZIN, both in slide 21081), Polar Ural, spring connecting 2 lakes, 19 August 1968, coll. K.N. Beltukova.

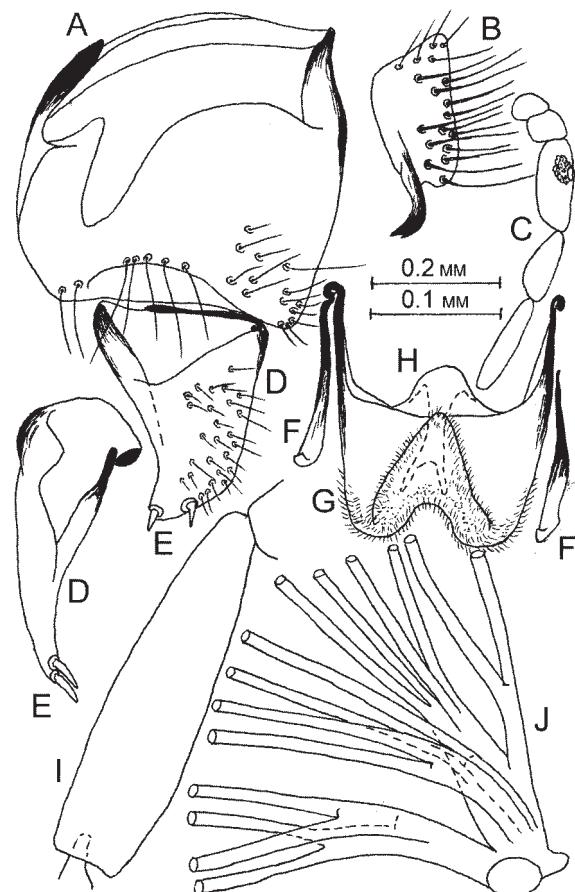
**Distribution.** Polar Ural (Crosskey and Howard 1997; Yankovsky 2002). Type locality: East side of middle part of Polar Ural.

**Remarks.** *Taeniopterna korshunovi* had been described as the subspecies of the species *T. macropyga* (Lundström, 1911) (Patrusheva 1975b), but the differences in the morphology between the former subspecies *T. macropyga korshunovi* and the species *T. macropyga* s.str. not lesser, than the differences between all the other species of the genus *Taeniopterna*, and *T. korshunovi* was treated as the separate species (Yankovsky 2002), and this consideration is confirmed here. The type material of *T. korshunovi* is deposited in the collection of BISB. It was written in author's description (Patrusheva 1975b: 513), that "the part of paratypes is deposited in the collection of ZIN", but in this collection 4 exemplars collected by Korshunov do not labelled as "paratypes", although the data and the locality on the slide labels are the same to the data and the locality cited in the original paper; thus it is very probable, that these exemplars are the paratypes mentioned by Patrusheva.

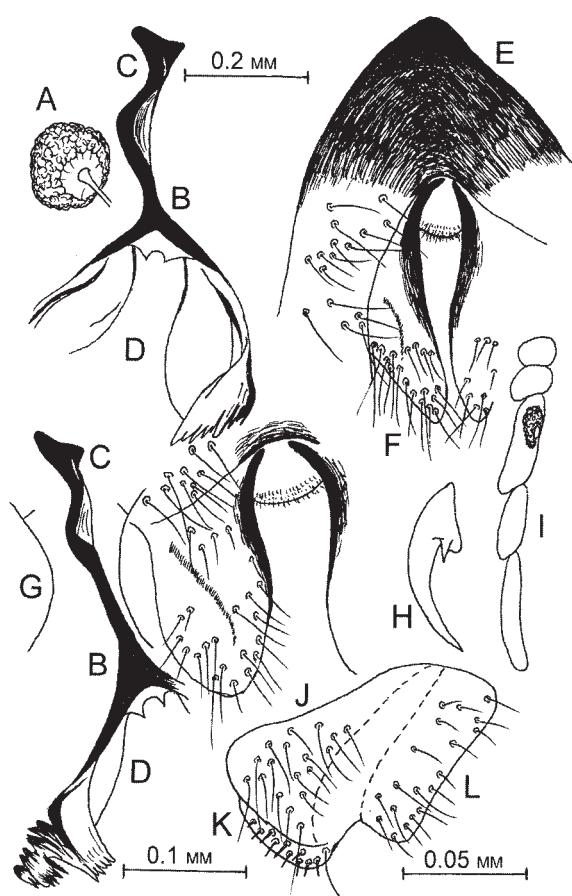
### 5. *Taeniopterna macropyga* (Lundström, 1911) (Figs. 11–13)

*Melusina macropyga* Lundström, 1911: 20  
*Taeniopterna macropyga* Enderlein 1925: 203  
*Hellichia latifrons* Enderlein 1925: 203  
*Prosimilium macropyga* Rubzov 1940: 268; 1956: 222, figs. 55, 56; 1960: 156, figs. 53, 54.

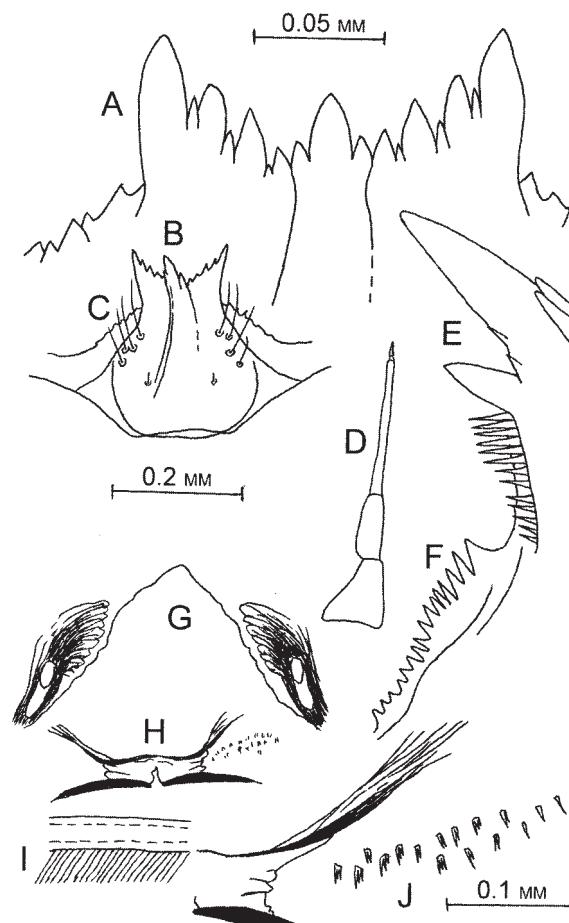
**Description. Male.** Length 3.0–3.5 mm. Scutum and abdomen mat black, with short yellowish golden hairs; halters and legs brownish black. Frons relatively (for males) wide, with long dark hairs. Hind basitarsus moderately widened, 3.7–4.0 times as long as wide. Gonocoxites 1.3–1.4 times as long as gonostyli, 1.2 times as wide as long (ventral view), not widened in basal part. Gonostyli subtriangular,



**Fig. 11.** *Taeniopterna macropyga* (Lundström, 1911). Male (A–I): A – gonocoxite; B – cercus; C – maxillary palp; D – gonostylus; E – apical spines on gonostylus; F – paramere; G – ventral plate; H – median sclerite; I – hind basitarsus. Pupa: J – basal part of gill. Scale bar: 0.2 mm = C, I, J; 0.1 mm = A, B, D, E, F, G, H.



**Fig. 12.** *Taeniopterna macropyga* (Lundström, 1911). Female: A – spermatheca; B – genital fork; C – stem of genital fork; D – posterior cleft of genital fork; E – abdominal sternite VIII; F – hypogynal valve; G – frons; H – claw; I – maxillary palp; J – anal lobe; K – spiniform setae on posterior blade of anal lobe; L – cercus. Scale bar: 0.2 mm = G, I; 0.1 mm = A, B, C, D, E, F, J, K, L; 0.05 mm = H.



**Fig. 13.** *Taeniopterna macropyga* (Lundström, 1911). Larva: A – hypostomal teeth; B – hypostoma; C – sublateral setae on hypostoma; D – antenna; E – mandibular teeth; F – mandibular serration; G – postgenal cleft; H – anal sclerite; I – microtrichiae on rays of primary fan of premandibles; J – thornlets near anal sclerite. Scale bar: 0.2 mm = B, C, G, H; 0.1 mm = D; 0.05 mm = A, E, F, I, J.

weakly narrowed distally, width at base twice width in distal part, in ventral view length slightly more than width at base, apical spines 2, short setae near apical spines not developed. Body of ventral plate 1.7 times as wide as long, with distinct triangular median keel, arms thin, apically curved backwards, moderately sclerotized. Gonopleurites as thin elongate plates evidently sclerotized basally. Median sclerite very widened in basal part, elongated and curved backward, not deeply bifurcated distally, branches not tapered. Cerci subrectangular, with 13–15 long hairs in distal part.

**Female.** Length 3.5–5.0 mm, antennae brownish black; scutum and abdomen black, with rare silver hairs, veins dark brown; halteres and legs yellowish brown, tarsi black. Frons relatively narrow, its least width 1.5–2.0 times less than height, with very sparse (16–18) long sublateral hairs and without submedian hairs. Mouthparts not of bloodsucking type. Maxillary palpi yellow, palpomere V 1.5 times as short as palpomeres III+IV, sensory vesicle more than  $\frac{1}{3}$  of length of palpomere III. Fore basitarsus 9–10 times as long as wide. Claws with distinctly developed and relatively large for this genus basal tooth. Hypogynal

valves elongated, 2.3–3.0 times as long as wide in middle part, 1.5 times as long as heavily sclerotized subtriangular abdominal sternite VIII, valves not tapered or slightly tapered, moderately spaced (maximal distance between valves  $\frac{1}{2}$  than width of valve in middle part), with several very long and rough hairs, median edges distinctly sclerotized. Stem of genital fork curved and widened distally, approximately equal in length or slightly longer than branches; branches markedly widened in distal part, postero-medial apodemes very small, tapered, disposed near beginning of branches; posterior cleft of genital fork (between branches) semi-oval, depth 1.5 width. Anal lobes subtriangular, 1.2 times as high and 1.6 times as long as cerci. Anal lobes 2.5 times, subrectangular cerci 3.3 times as high as long, posterior blade of anal lobes with 10–11 small spiniform setae. Spermatheca rounded,  $\frac{1}{3}$  of length of branch of genital fork.

**Larva.** Length 7–9 mm, head capsule light yellow, body dirty brown. Head pattern brown, distinct. Antennae very short, less than  $\frac{1}{3}$  of length of stalks of premandibles, articles I+II equal in length to article III, article I equal in length to article II, article II without additional wrinkles. Primary fan of premandibles with 24–27 rays, secondary fan with 12–13, median fan with 16–18 rays; primary fan rays with microtrichia of equal length, as long as diameter of ray in middle part. Lateral hypostomal teeth V twice as long as median tooth, lateral teeth IV longer than III; each side of hypostoma with 4 sublateral setae. Postgenal cleft triangular with distinct anterior edge, not covered with membrane, postgenal bridge 1.4 times as short as hypostoma. Outer teeth of mandibles of moderate length, apical tooth 3 times as long as outer teeth and as preapical tooth III, preapical teeth I and II very small almost undistinguishable; inner mandibular teeth 12–13; mandibular serration of 16–18 notches arranged in simple line, first notch larger than others. Anal sclerite short, upper and lower branches about equal in length; posterolaterally from each upper branch stripe of 15–17 small simple, bifurcated or triplex thornlets arranged downward. Posterior circlet of 66–68 rows with 9–11 hooklets in each row, lower branches of anal sclerite extend as far as rows VI–VII.

**Pupa.** Body length 4.5–5.0 mm. Gills dark brown, slightly more than  $\frac{1}{2}$  of pupal body length, of 14 filaments about equal in length and diameter, filaments disposed on 4 short thick stems, scheme of divergence (2+4)+2+2+(2+2); angle between basal parts of up-

per and lower filaments about 60°. Cocoon covers all the body of pupa.

**Material.** 1 male (ZIN, pinned), Tobol'sk Gubernia [Tyumen' Province], Pemal, 4 August 1909, coll. F. Zaytsev; 1 male (ZIN, slide 4169), [Kolskiy Peninsula], Khibiny Mounts, Vudyavr Lake, Kolsk, 13 September 1909, coll. Cheburova; 2 males (ZIN, slides 4170, 4171), 5 males, 9 females (ZIN, pinned), same locality, 26 August 1930, coll. Cheburova; 1 male, 3 females (ZIN, pinned), same locality, 13–15 September 1930, coll. Cheburova; 2 males (ZIN, pinned), same locality, 12–13 September 1931, coll. V. Fridolin; 6 females (ZIN, pinned), same locality, September 1935, coll. V. Fridolin; 2 males (ZIN, pinned), same locality, 20–22 August 1936, coll. V. Fridolin; 1 male (ZIN, slide 3905), 3 males (ZIN, pinned, parts of 2 males in slides 2280, 4811 on same pins), Ural, Obdorsk, Voykar River Basin, 14–23 August 1925, coll. V. Fridolin; 1 female (ZIN, slide 3148), 12 males (ZIN, pinned), [Kolskiy Peninsula], Khibiny Mounts, Kukis-Vu River Valley, 24–26 August 1930, coll. V. Fridolin; 26 males (ZIN, pinned), same locality, 9–21 September 1933, coll. V. Fridolin; 6 males (ZIN, pinned), same locality, 21–24 August 1934, coll. V. Fridolin; 1 male (ZIN, slide 3021), [Kolskiy Peninsula], Khibiny Mounts, Vudyavr Lake Basin, 26 August 1930, coll. V. Fridolin; 5 males (ZIN, pinned), same locality, 15 September 1930, coll. V. Fridolin; 1 male (ZIN, slide 1345), same locality, 30 August 1932, coll. Fridolin; 1 male (ZIN, pinned), same locality, 21 September 1932, coll. Cheburova; 5 males (ZIN, pinned), same locality, 27 September 1932, coll. V. Fridolin; 2 females (ZIN, slides 3014, 3015), same locality, 10 September 1933, coll. Fridolin; 2 females (ZIN, slides 3011, 3012), 5 males (ZIN, slides 3013, 3016–3019), same locality, 17 September 1933, coll. Fridolin; 1 male (ZIN, slide 2541), [Kolskiy Peninsula], Khibiny Mounts, Petrelius River Valley, 15 August 1931, coll. Fridolin; 1 larva (ZIN, slide 3032), 1 female (ZIN, slide 3035), [Kolskiy Peninsula], Khibiny Mounts, 31 August 1932, coll. Fridolin; 1 larva (ZIN, slide 2585), East Siberia, 1933, coll. I.A. Rubzov; 1 larva (ZIN, slide 2527), "A.G.Z." [Altai State Preserve], Karlagash River, 23 July 1947, coll. Iogansen; 1 mature female pupa (ZIN, pinned, genitalia in slide 4943 on same pin), Murmansk Province, Shonguy Railway Station, 24 August 1951, coll. Z.V. Usova; 1 male with pupal exuviae (ZIN, slide 6527), [East Siberia], Irkutsk Province, Udugasha River, left affluent of Kitoy River, 14 May 1952, coll. Boldaruev;

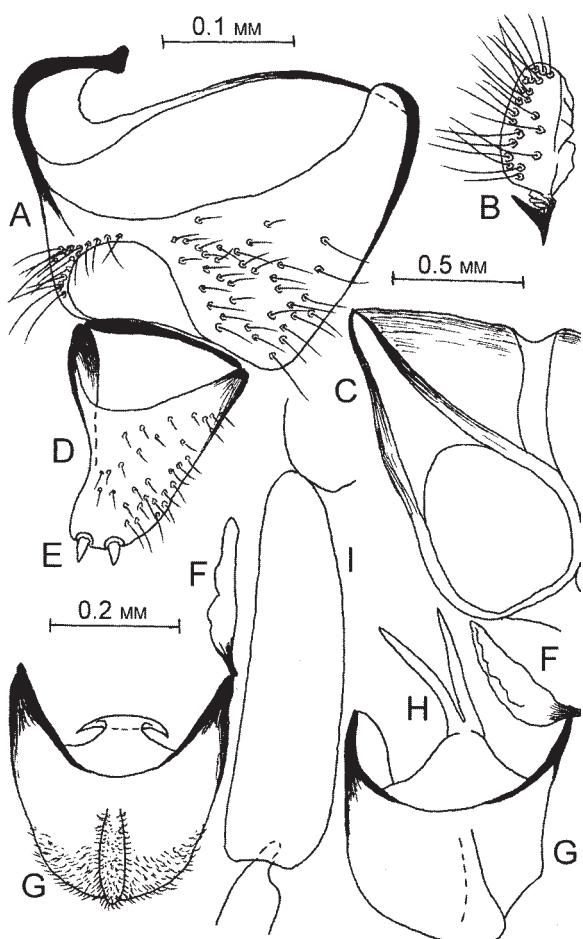
1 pupa, 2 mature male pupae (ZIN, pinned, genitalia in slides 6492, 8502), 1 mature female pupa (ZIN, pinned, genitalia in slide 6550), Murmansk Province, Kirovskiy Spring, 6 August 1952, coll. Z.V.Usova; 1 larva with pupal gill histoblasts (ZIN, slide 9647), [Perm' Territory], Krasnovishersk District, Zolotyanka River, affluent of Uls River, 18 July 1954, coll. unknown; 1 larva with pupal gill histoblasts (ZIN, slide 17432), [Sweden, Lapland], Sennajokks ovredel 11 km NNE Ammarnäs, 19 July 1961, coll. A. & S. Ulfstrand; 4 males with pupal exuviae (ZIN, slides 4516-4519), 5 larvae with pupal gill histoblasts (ZIN, slides 14533-14536, 14792), 1 pupa (ZIN, slide 14785), Polar Ural, Sob' River near Rayiz, 4-5 August 1961, coll. K.B.Gorodkov; 1 pupa (ZIN, slide 17270), Komi Republic, Inta District, spring in Kozhima River Basin, 30 July 1962, coll. Gabova; 1 larva with pupal gill histoblasts (ZIN, slide 15360), 1 larva (ZIN, slide 15361), Komi Republic, Luz'va River, 23 August 1962, coll. Solovkina; 2 larvae (ZIN, slides 17088, 17135), Sweden, Lapland, Hemavan, 1000 m [above sea level], 11 July 1963, coll. G. Carlsson; 1 larva (ZIN, slide 17274), Altai Highland, Tyurgen' River, 12 July 1963, coll. S.I.Bobrova; 1 larva with pupal gill histoblasts (ZIN, slide 19672), [Tuva], Sayany Mounts, spring on highway 167 km from Kyzyl, 17 August 1963, coll. N.A.Violovich; 3 females with pupal exuviae (ZIN, slides 20277-20279), 1 larva (ZIN, slide 20285), 3 pupae with eggs (ZIN, slides 20283-20285), Mongolia, Bayan Ol'gii, stream, 1700 m [above sea level], 25 August 1964, coll. unknown; 1 larva (ZIN, slide 20606), Kyrgyzstan, Kunchey-Alatoo Mounts, spring near mountain pass, affluent of Chots-Aksu River, 18 July 1965, coll. E.O. Konurbaev; 1 larva (ZIN, slide 18824), Altai, Gramatukha River, 13 August 1965, coll. S.I. Bobrova; 1 larva with pupal gill histoblasts (ZIN, slide 19661), Yakutia, Ust'Yansk District, Kular, Burgaat River, 27 July 1967, coll. E.I. Worobez; 1 larva with pupal gill histoblasts (ZIN, slide 21160), same locality, 19 July 1968, coll. E.I. Worobez; 1 larva with pupal gill histoblasts (ZIN, slide 19717), Yakutia, Ust'Yansk District, Kular, Ilistyy Spring, 1 August 1968, coll. E.I. Worobez; 2 larvae (ZIN, slide 20602, 20603), Kyrgyzstan, Son-Kul' Lake, Tulek River, 3500 m [above sea level], 21 July 1971, coll. E.O. Konurbaev.

**Distribution.** Finland, Norway, Sweden, N of European Russia, Siberia, Kyrgyzstan (?), Mongolia (?) (Crosskey and Howard 1997; Yankovsky 2002). Type locality: most likely Northern Finland.

**Remarks.** The remained type material of *Taeniopterna macropyga* now is in bad condition (including labels), and is not suitable for investigation (Dr. J. Ilmonen, private message). But it is very probably that I.A.Rubzov had the possibility to check the Lundström's material in 1950-th yet in good condition (before the edition of the Fauna of the USSR in 1956), and his description and drawings can be used in the comparison with the re-description of this species based on the exemplars from the collection of ZIN. I.A.Rubzov (1956: 225) wrote that "the type has been described from Finland", but this conclusion was not confirmed anywhere else. The type locality of *T. macropyga* in 1911 (when Finland was a part of the Russian Empire) had been designed by Lundström as "Lapponia rossica" (Northern Finland? Kolskiy Peninsula?). In all the drawings and the characters given here only the exemplars collected in the Kolskiy Peninsula and in the Northern Sweden were used, as collected in the most nearness to the supposed type locality of the specimens used in the original description of Lundström. In any way the analysis of the variability of the characters of *T. macropyga* s.l. on the great territory from Fennoscandia to Mongolia is not the subject of this paper. It seems to be that it is the subject of the separate studying, with taking into account the unavoidable serious doubts, for example, concerning the identification of the exemplars collected in Kyrgyzstan and Mongolia as belonging to the species *T. macropyga* s.str.

#### 6. *Taeniopterna nenetz* Yankovsky sp.n. (Fig. 14)

**Description. Male.** Length 3-4 mm. Antennae and maxillar palpi black. Frons narrow, with long stick black hairs. Scutum black, shine, with short rare silvery hairs. Abdomen black, dorsally with short, ventrally with long silvery hairs. Halteres black. Legs brownish-black. Hind basitarsus moderately widened, 4 times as long as wide. Gonocoxites 1.3-1.4 times as long as gonostyli, 1.4-1.5 times as wide as long, widened in basal part. Gonostyli subtriangular, moderately narrowed distally, width at base 2.2-2.3 times width in distal part (ventral view), in ventral view 1.2 times as long as wide at base, apical spines 2. Body of ventral plate flattened, length about equal to maximum width, with moderately developed median keel, arms short and widened, not curved backwards, heavily sclerotized. Gonopleurites as moderately



**Fig. 14.** *Taeniopterna nenetzi* Yankovsky sp.n. Male (holotype): A – gonocoxite; B – cercus; C – conical posterior dorsal projection on tergite IX; D – gonostylus; E – apical spines on gonostylus; F – paramere; G – ventral plate; H – median sclerite; I – hind basitarsus. Scale bar: 0.5 mm = C; 0.2 mm = I; 0.1 mm = A, B, D, E, F, G, H.

widened semi-oval elongated plates with short sclerotized basal projection. Median sclerite very widened in basal part, elongated and curved backward, distally very deeply bifurcated, branches tapered. Cerci oval, with distinct sclerotized rostriform triangular projection and with 20–22 long setae.

*Female, larva and pupa* unknown.

**Holotype.** Male (ZIN, pinned, details in slide 17316, on same pin), Arkhangelsk Province, [Nenetskiy District], Sikhova-Yakha River, Arkhan, 80 km N Khalmyryu, 19 July 1961, coll. K.B. Gorodkov.

**Paratypes.** 5 males (ZIN, pinned, details of 2 males in slides 17315, 17317, on same pins), same

data; 3 males (ZIN, pinned), Arkhangelsk Province, [Nenetskiy District], Amderma, 12 August 1961, coll. K.B. Gorodkov.

**Type deposition.** Holotype and paratypes in ZIN/

**Distribution.** N of European Russia (Arkhangelsk Province).

**Differential diagnosis.** From the relative species *Taeniopterna zaitzevi* (Rubzov, 1956) (described as *T. macropyga zaitzevi*) males of *T. nenetzi* differ by following characters. Hind basitarsus moderately widened, 4 times as long as wide (vs. *T. zaitzevi* very widened, 2.8 times as long as wide). Gonostyli with 2 apical spines (vs. *T. zaitzevi* with 3 apical spines). Ventral plate with distinct median keel (vs. *T. zaitzevi* without distinct keel). Median sclerite enormously widened in basal part and deeply bifurcated distally, with long thin branches (vs. *T. zaitzevi* moderately widened in basal part, very long and narrow, almost without distal bifurcation). From the relative species *T. tiksi* Yankovsky, sp.n. (see below) males of *T. nenetzi* differ by following characters. Gonocoxites slightly longer than gonostyli (vs. *T. tiksi* twice as long as gonostyli). Gonostyli with 2 apical spines (vs. *T. tiksi* with 3 apical spines). From the relative species *T. ventosa* males of *T. nenetzi* differ by following characters. Gonocoxites distinctly widened in basal part (vs. *T. ventosa* almost not widened). Gonostyli narrowed distally, width at base 2.5 times width in distal part (vs. *T. ventosa* weakly narrowed, width at base 1.6 times width in distal part). Gonopleurites with short sclerotized projection (vs. *T. ventosa* without projection).

**Remarks.** All specimens in the fund collection of ZIN were labelled by I.A. Rubzov as “?zaitzevi?”, thus he was not assured in his own preliminary identification. In fact the morphology of these males distinctly differs from *Taeniopterna zaitzevi* (Rubzov, 1956), and these exemplars are described as a new species. The type material is deposited in the collection of ZIN.

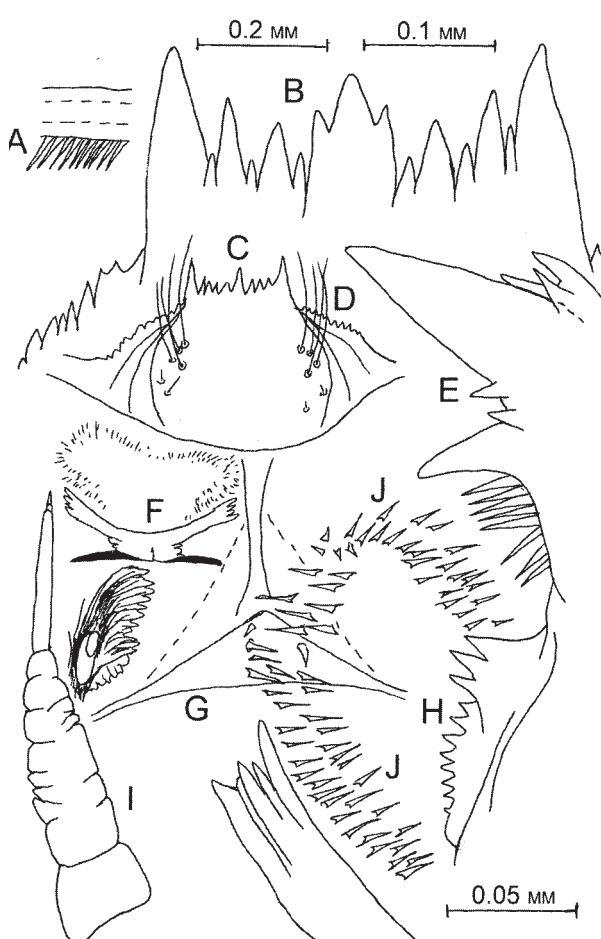
#### 7. *Taeniopterna pamirica* (Chubareva et Petrova, 1983)

(Figs. 1, 15)

*Prosimulium pamiricum* Chubareva et Petrova, 1983: 142, fig. 1.

**Description.** *Male and female* unknown.

**Larva.** [Length 10–11 mm, body brownish gray (Chubareva and Petrova 1983: 142)]. Head capsule



**Fig. 15.** *Taeniopterna pamirica* (Chubareva et Petrova, 1983). Larva (holotype): A – microtrichiae on rays of primary fan of premandibles; B – hypostomal teeth; C – hypostoma; D – sublateral setae on hypostoma; E – mandibular teeth; F – anal sclerite; G – postgenal cleft; H – mandibular serration; I – antenna; J – thornlets near anal sclerite. Scale bar: 0.2 mm = C, D, F, G; 0.1 mm = I; 0.05 mm = A, B, E, H, J.

dark, head pattern nearly black, distinct. Antennae distinctly (twice or more) shorter than stalks of premandibles, articles I+II twice as long as article III, article I 3.5 times as short as article II, article II with 5–7 distinct additional wrinkles. Primary fan of premandibles with 13–15 rays, secondary fan with 13–16, median fan with 13–15 rays; primary fan rays with unusually thick microtrichia of equal length,  $\frac{1}{2}$  of diameter of ray in middle part. Lateral hypostomal teeth V 1.3–1.4 times as long as median tooth, lateral teeth IV longer than III; each side of hypostoma with 4 sublateral setae. Postgenal cleft obtuse subtriangu-

lar and covered with thin membrane, postgenal bridge about equal in length to hypostoma. Outer teeth of mandibles short, less than  $\frac{1}{4}$  of apical tooth, peculiar structure is evidently distinguishable additional third short outer tooth arranged inward (other known Palearctic Simuliidae always have only 2 outer teeth); apical tooth unusually short and thick; preapical tooth III 2 times as short as apical tooth and 3–4 times as long as preapical teeth I and II; inner mandibular teeth 8–9; mandibular serration of 11–12 notches arranged into two groups (3 notches in anterior and 8–9 notches in posterior group). Anal sclerite short, upper branches 1.5 times as long as lower ones; anteriorly of upper branches circlet of simple thornlets arranged upward. Posterior circlet of 96–98 rows with 9–10 hooklets in each row, lower branches of anal sclerite extend as far as rows VIII–X.

**Pupa.** Gills dark, of 16 thick filaments approximately equal in diameter and length, filaments disposed compactly on 2 very short thick stems, scheme of divergence 12+4; angle between basal parts of upper and lower filaments about  $120^\circ$ .

**Holotype.** Larva with pupal gill histoblasts (ZIN, slide 20738), [Tajikistan], Pamir, Tokuzbulak River, 15 km W Koytezek Pass, 4000 m above sea level, 28 July 1979, coll. N.A. Petrova.

**Additional material.** 2 larvae with pupal gill histoblasts (ZIN, both in slide 930 in collection of laboratory of karyosystematics), [Tajikistan], Pamir, Tokuzbulak River, 15 km W from Koytezek Pass, 4000 m [above sea level], 28 July 1979, coll. N.A. Petrova.

**Distribution.** Tajikistan (Crosskey and Howard 1997; Yankovsky 2002).

**Remarks.** *Taeniopterna pamirica* is the peculiar triploid species, dwelling the biotopes with the extreme environmental conditions (Pamir, 4000 m above sea level). The reducing of the number of the rays of all fans of the premandibles and the peculiar morphology of the mandibles possibly connected with the adaptations to the extreme. Males (and imago at all) are unknown, and authors had surmised the possibility of the parthenogenetic life cycle in this species (Chubareva and Petrova 1983: 143).

#### 8. *Taeniopterna tiksi* Yankovsky sp.n. (Fig. 16)

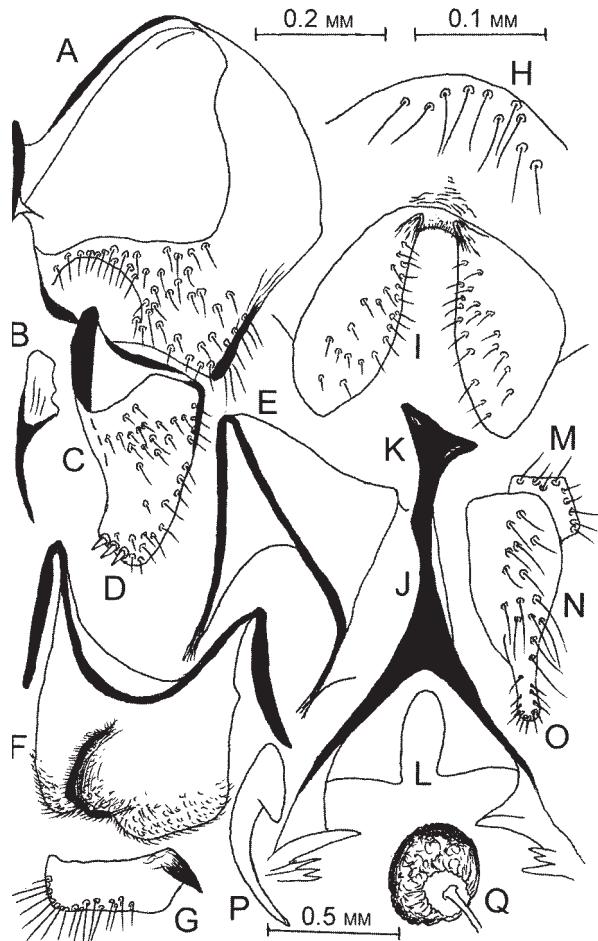
**Description. Male.** Length 2.5–3.0 mm. Antennae and maxillary palpi black. Frons, clypeus and scutum glossy black, almost without hairs (only on frons

and scutum several short dark hairs). Abdomen black with short black hairs. Halteres grayish black. Legs wholly black. Hind basitarsus moderately widened, 4.0 times as long as wide. Gonocoxites 1.8 times as long as gonostyli, 1.3 times as long as wide, not widened in basal part. Gonostyli subtriangular, weakly narrowed, rounded distally (width at base twice width in distal part), in ventral view 1.6 times as long as wide at base, apical spines 3. Body of ventral plate flattened, 1.5 times as wide as long, with distinctly developed and pigmented median keel, arms long, curved backwards and sclerotized. Gonopleurites as small subrectangular sclerite with very long narrow heavily sclerotized spine-form projection. Cerci subrectangular, with short rostriform sclerotized dorsal projection and with 15–16 relatively short hairs only in distal part.

**Female.** Length about 4 mm. Antennae and maxillary palpi black. Frons very wide, its least width twice more than height, with sparse sublateral hairs and without submedian hairs. Frons, clypeus and scutum glossy black, scutum with rare silvery hairs. Mouthparts not of bloodsucking type. Abdomen black, with short dense silvery hairs. Halteres grayish white. Legs brown, distal  $\frac{1}{4}$  of femur, basal and distal  $\frac{1}{4}$  of tibia and tarsi black. Fore basitarsus 6–8 times as long as wide. Claws toothless. Hypogynal valves 1.7 times as long as wide in middle part, 1.3–1.4 times as long as weakly sclerotized sternite VIII (without triangular apodeme), slightly tapered, relatively widely spaced (maximal distance between valves about  $\frac{3}{4}$  width of valve in middle part), with relatively short and thin hairs; anteromedial angles of valves protruded, but almost not sclerotized. Stem of genital fork strongly sclerotized, distinctly widened apically, 1.2 times as short as branches; branches weakly sclerotized, moderately widened in distal part, posteromedial apodemes large, membranous, right-angled, relatively widely spaced; posterior cleft of genital fork (between apodemes) narrow (length 2.5 width). Anal lobes approximately oval, about 3 times as high and 3.5 times as long as cerci. Anal lobes 2.3 times, cerci 3 times as high as long; posterior blade of anal lobes markedly elongated as narrow projection, with 10–12 small spiniform setae. Spermatheca rounded,  $\frac{1}{3}$  of length of branch of genital fork.

*Larva and pupa* unknown.

**Holotype.** Male (ZIN, pinned, details in slide 17318, on same pin), [E Siberia], Yakutia, Tiksi, 11 August 1957, coll. K.B. Gorodkov.



**Fig. 16.** *Taeniopterna tiksi* Yankovsky sp.n. Male (holotype) (A–G): A – gonocoxite; B – paramere; C – gonostylus; D – apical spines on gonostylus; E – conical posterior dorsal projection on tergite IX; F – ventral plate; G – cercus. Paratype female (H–Q): H – abdominal sternite VIII; I – hypogynal valve; J – genital fork; K – stem of genital fork; L – posterior cleft of genital fork; M – cercus; N – anal lobe; O – spiniform setae on posterior blade of anal lobe; P – claw; Q – spermatheca. Scale bar: 0.5 mm = E; 0.1 mm = A, B, C, D, F, G, H, I, J, K, L, M, N, O, Q; 0.05 mm = P.

**Paratypes.** 1 female (ZIN, pinned, details in slide 17319, on same pin), same locality, 12 August 1957, coll. K.B. Gorodkov; 1 male (ZIN, pinned), same locality, 13 August 1957, coll. K.B. Gorodkov.

**Type deposition.** Holotype and paratypes in ZIN.

**Distribution.** E Siberia (N Yakutia).

**Differential diagnosis.** From the relative species *Taeniopterna zaitzevi* (Rubzov, 1956) (described as *T. macropyga zaitzevi*) males of *T. tiksi* differ by following characters. Hind basitarsus moderately widened,

4.0 times as long as wide (vs. *T. zaitzevi* very widened, 2.8 times as long as wide). Gonocoxites 1.8 times as long as gonostyli (vs. *T. zaitzevi* slightly longer than gonostyli). Gonostyli with 3 apical spines of equal size and disposed compactly (vs. *T. zaitzevi* 3 apical spines disposed distantly each from others and dorsal spine twice lesser than others). Very long and narrow median sclerite (as in *T. zaitzevi*) not developed. Female of *T. zaitzevi* unknown. From the males of relative species *T. nenetz* Yankovsky, sp.n. (see above) males of *T. tiksi* differ by following characters. Gonocoxites 1.8 times as long as gonostyli (vs. *T. nenetz* 1.3–1.4 times), 1.3 times as long as maximal wide (ventral view) (vs. *T. nenetz* 1.4–1.5 times as short as maximal wide). Arms of ventral plate very long, curved backwards (vs. *T. nenetz* short and tapered). Projection of gonopleurites very long, narrow, spine-form and heavily sclerotized (vs. *T. nenetz* short and moderately sclerotized). Female of *T. nenetz* unknown. From the relative species *T. ventosa* males of *T. tiksi* differ by following characters. Gonocoxites 1.8 times as long as gonostyli (vs. *T. ventosa* slightly longer). Gonostyli with 3 apical spines (vs. *T. ventosa* with 2 apical spines). Arms of ventral plate very long, curved backwards (vs. *T. ventosa* short and widened, not curved backwards). Gonopleurites with very long narrow heavily sclerotized projection (vs. *T. ventosa* without projection). Females of *T. tiksi* differ from females of *T. ventosa* by following characters. Antennae of 11 articles (vs. *T. ventosa* of 10 articles). Hypogynal valves relatively widely spaced, without large robust hairs (vs. *T. ventosa* closely spaced, with large dense robust hairs). Stem of genital fork distinctly widened apically, 1.2 times as short as branches, posteromedial apodemes of branches large, membranous, right-angled (vs. *T. ventosa* not widened apically, 1.4 times as long as branches, posteromedial apodemes very small, tapered, disposed near beginning of branches).

**Remarks.** All the 3 specimens (including female) deposited in the fund collection of ZIN were identified (and labelled) by I.A. Rubzov as “?zaitzevi? from the group *macropyga*” (see above remarks to *Taeniopterna nenetz* Yankovsky, sp.n.). But the female of *Taeniopterna zaitzevi* was not described in 1956, was unknown in 1957 (the datum of the collection by K.B. Gorodkov), and is unknown now. The morphology of the male of the new species distinctly differs from the morphology of the male of *T. zaitzevi* (Rubzov, 1956), and these males and female are de-

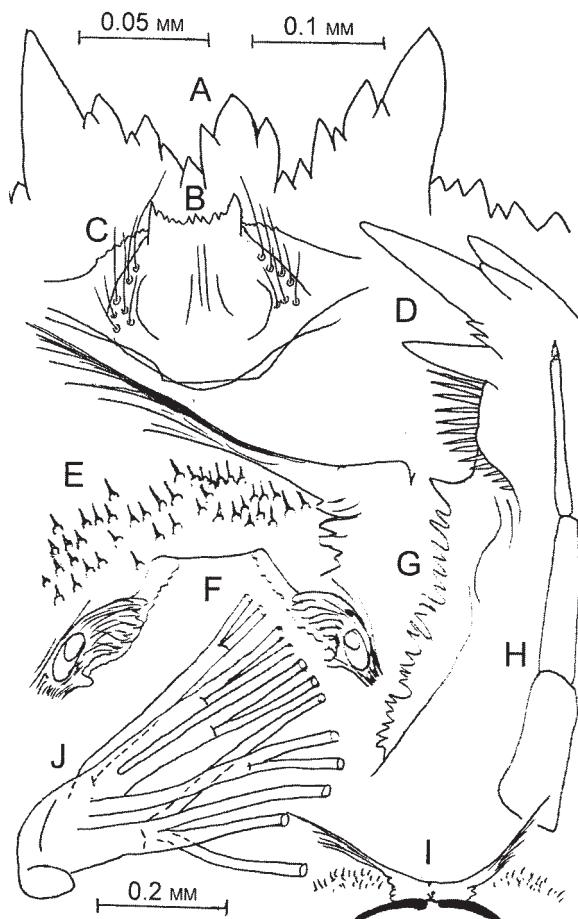
scribed here as a new species. The type material is deposited in the collection of ZIN.

### 9. *Taeniopterna tredecimfistulata* (Rubzov, 1956) (Fig. 17)

*Prosimulium tredecimfistulatum* Rubzov, 1956: 227, fig. 59; 1960: 160, fig. 57.

**Description.** Male and female unknown.

**Larva.** [Length 7.5–9.5 mm; body grayish brown (Rubzov 1956: 227)]. Head pattern as pale spots on dark background, hardly distinguishable. Antennae distinctly shorter than stalks of premandibles, articles I+II twice as long as article III, article I 1subequal



**Fig. 17.** *Taeniopterna tredecimfistulata* (Rubzov, 1956). Larva (lectotype) (A–I): A – hypostomal teeth; B – hypostoma; C – sublateral setae on hypostoma; D – mandibular teeth; E – thornlets near anal sclerite; F – postgenal cleft; G – mandibular serration; H – antenna; I – anal sclerite. Pupa: J – basal part of gill. Scale bar: 0.2 mm = B, C, F, I, J; 0.1 mm = H; 0.05 mm = A, D, E, G.

in length to article II, article II without additional wrinkles. Primary fan of premandibles with 28–30 rays, secondary fan with 21–23, median fan with 20–22 rays; primary fan rays with microtrichia of equal length, as long as diameter of ray in middle part. Lateral hypostomal teeth V twice as long as median tooth, lateral teeth IV longer than III; each side of hypostoma with 7–8 sublateral setae. Postgenal cleft small, not covered with membrane, with transverse anterior edge, postgenal bridge about equal in length to hypostoma. Outer teeth of mandibles relatively large, apical tooth twice as long as outer teeth and as preapical tooth III, preapical teeth I and II very small and practically undistinguishable; inner mandibular teeth 12–14; mandibular serration of 1 (first) large and 20–23 smaller notches arranged in simple line. Anal sclerite short, upper branches 2.5 times as long as lower branches; posterolaterally from each upper branch stripe of 40–45 relatively large simple thornlets of peculiar shape (see drawing), arranged upward. Posterior circlet of 66 rows with 11–13 hooklets in each row, lower branches of anal sclerite extend as far as rows VIII.

**Pupa.** [Body length 4–5 mm (Rubzov 1956: 228)]. Gills brown, less than  $\frac{1}{2}$  of pupal body length, of 12 filaments approximately equal in length and diameter, filaments disposed on 2 short very thick stems, scheme of divergence  $(2+2)+[2+(2+2)+2]$ ; angle between basal parts of upper and lower filaments about  $45^\circ$ .

**Lectotype** (des. Yankovsky 1995: 53). Larva with pupal gill histoblasts (ZIN, slide 6701) [East Siberia, Irkutsk Province], Bil'chir River, affluent of Sagan-Ugun River, 17 August 1952, coll. V.O. Boldaruev.

**Paralectotype** (des. Yankovsky 1995: 53). 1 larva with pupal gill histoblasts (ZIN, slide 6702), same data.

**Additional material.** 5 pupae (ZIN, pinned, details of pupae and remained larval details in slides 6501, 6506, 6507, 6704, 6705 on same pins), Irkutsk Province, Bilchir River (affluent of Sagan-Ugun River), 17 August 1952, coll. V.O. Boldaruev; 2 pupae (ZIN, pinned, details of pupae and remained larval details in slides 6517, 6518 on same pins), Irkutsk Province, Arkhut River (affluent of Kitoy River), 17 August 1952, coll. V.O. Boldaruev.

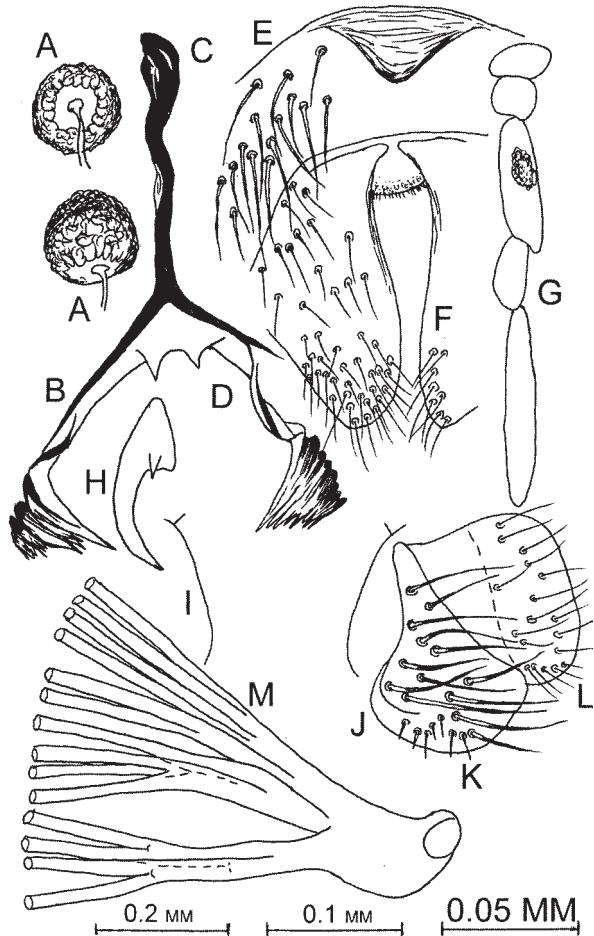
**Distribution.** E Siberia (Baikal Region) (Crosskey and Howard 1997; Yankovsky 2002).

**Remarks.** The checking of the type material of this species has shown that the pupal gills of *Taeniopterna tredecimfistulata* consist of 12 filaments (the fil-

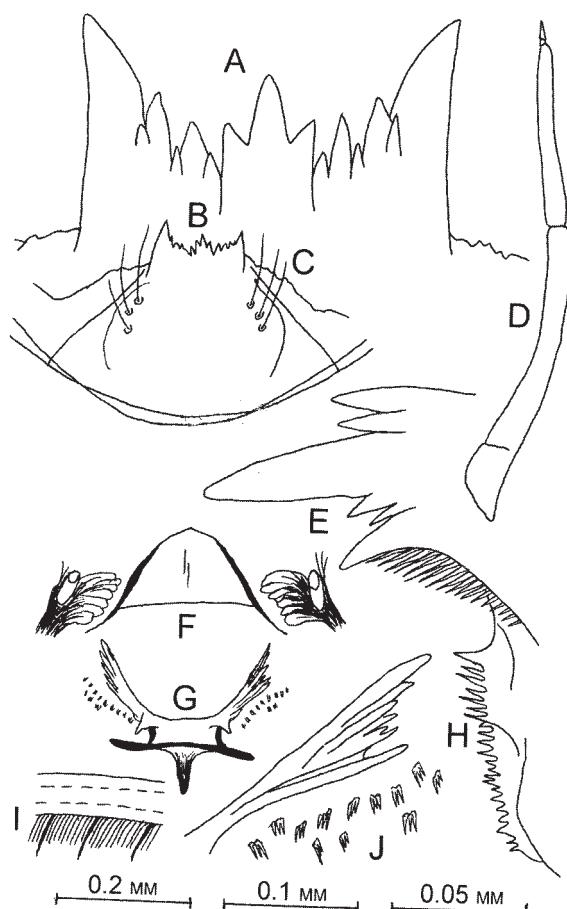
aments of the pupal gills in the slides are very twisted, and the quantity 13 in the original description is erroneous), so the species name *tredecimfistulata* seems not suitable morphologically, but is correct formally.

#### 10. *Taeniopterna ursina* (Edwards, 1935) (Figs. 18, 19)

*Simulium (Prosimulium) ursinum* Edwards, 1935: 535.  
*Prosimulium ursinum* Rubzov 1956: 837, fig. 421; 1961: 161, fig. 58; Adler et al. 2004: 271, figs. 4.30, 10.34, 10.53, 10.77, 10.115, 10.564, 10.625, map 53.  
*Prosimulium (Prosimulium) ursinum* Peterson 1970: 139, figs. 27, 76, 122, 151, 152.



**Fig. 18.** *Taeniopterna ursina* (Edwards, 1935). Female (A–L): A – spermatheca; B – genital fork; C – stem of genital fork; D – posterior cleft of genital fork; E – abdominal sternite VIII; F – hypogynal valve; G – maxillary palp; H – claw; I – frons; J – anal lobe; K – spiniform setae on posterior blade of anal lobe; L – cercus. Pupa: M – basal part of gill. Scale bar: 0.2 mm = G, I, M; 0.1 mm = A, B, C, D, E, F, J, K, L; 0.05 mm = H.



**Fig. 19.** *Taeniopterna ursina* (Edwards, 1935). Larva: A – hypostomal teeth; B – hypostoma; C – sublateral setae on hypostoma; D – antenna; E – mandibular teeth; F – postgenal cleft; G – anal sclerite; H – mandibular serration; I – microtrichiae on rays of primary fan of premandibles; J – thornlets near anal sclerite. Scale bar: 0.2 mm = B, C, F, G; 0.1 mm = D; 0.05 mm = A, E, H, I, J.

**Description.** Males do not exist (females are parthenogenetic).

**Female.** [Length 5.0–5.5 mm; body black, legs black, partly dark grey (Rubzov 1956: 837, 838; 1961: 161)]. Frons very wide, its least width markedly more than height, with dense long black rough sublateral and median hairs. Mouthparts not of bloodsucking type. Maxillary palpi dark brown, palpomere V slightly longer than palpomeres III+IV, sensory vesicle about  $\frac{1}{4}$  of length of palpomere III. Fore basitarsus nearly 10 times as long as wide. Claws with very small but clearly distinguishable basal tooth. Hypogynal valves elongated, 2.3 times as long as wide in middle part, twice as long as weakly sclerotized abdominal ster-

nite VIII (without triangular anterior apodeme), not distinctly tapered, closely spaced (maximal distance between valves less than  $\frac{1}{2}$  width of valve in middle part), with long stout hairs almost over all the surface (excluding median edges), anteromedial angles of valves weakly protruded and almost not sclerotized. Stem of genital fork not widened and slightly curved distally, about equal in length to branches; branches moderately widened in distal part, posteromedial apodemes very small, tapered, disposed near beginning of branches; posterior cleft of genital fork (between branches) semi-oval, width slightly more than depth. Anal lobes subtriangular, 1.2 times as high and twice as long as cerci. Anal lobes 1.4 times, subrectangular cerci 2.3 times as high as long, posterior blade of anal lobes with 5–7 relatively large spiniform setae. Spermatheca rounded, less than  $\frac{1}{3}$  of length of branch of genital fork.

**Larva.** [Length 6–11 mm, body yellow to grayish brown (Rubzov 1956: 838; 1961: 161; Peterson 1970: 136)]. Head capsule yellow, head pattern dark, distinct. Antennae thin, 1.5 times as short as stalks of premandibles, articles I+II 1.6–1.7 times as long as article III, article I 5.5 times as short as article II, article II without additional wrinkles. Primary fan of premandibles with 22–26 rays, secondary fan with 19–20, median fan with 12–13 rays; primary fan rays with microtrichia of 2 types: long (equal in length to diameter of ray in middle part), and short ( $\frac{2}{3}$  as long as diameter of ray). Lateral hypostomal teeth V twice as long as median tooth, lateral teeth IV longer than III; each side of hypostoma with 3 sublateral setae. Postgenal cleft with rounded anterior edge, covered with thin membrane, postgenal bridge about twice as short as hypostoma. Outer teeth of mandibles relatively large, in length about  $\frac{1}{3}$  of apical tooth; preapical tooth III 2 times as short as apical tooth and 2 times as long as unusual large preapical teeth I, II; inner mandibular teeth 16–18; mandibular serration of 21–22 conical notches arranged into two groups (7 anterior and 14–15 posterior), first notch larger than others. Anal sclerite of peculiar shape, as in the genus *Levitinia* Chubareva et Petrova, 1981 – it consists of 5 branches (while in all other simuliids of 4 or, rarely, of 3 branches), upper branches twice as long as lower and median branches; posteriorly of each of upper branches 10–12 relatively large triplex thornlets arranged downward. Posterior circlet of 66–78 rows with 10–14 hooklets in each row, lower branches of anal sclerite extend as far as rows V–VI.

**Pupa.** [Body length 3.6– 6.6 mm; cocoon very friable, covers most of pupal body (Rubzov 1956: 839; 1961: 162); Peterson 1970: 142]. Gills dark brown,  $\frac{1}{3}$  of pupal body length, of 14 filaments approximately equal in diameter and length, filaments in Palaearctic specimens diverge as relatively narrow cluster, disposed on 3 stems of different length, scheme of divergence (4+2)+(2+2)+(2+2); angle between basal parts of upper and lower filaments in Palaearctic specimens about 45°, in Nearctic specimens about 90°.

**Material.** 1 female with pupal exuviae (ZIN, slide 9382), [?] Reydarva, island, July 1948, coll. Landa; 1 larva with pupal gill histoblasts (ZIN, slide 9383), [?] Bisberpobrappa, island, 9 July 1948, coll. Landa; 1 female with pupal exuviae (ZIN, slide 17101), 2 females (ZIN, slides 17103, 17104), Norway, Juvasshytte, 1840 m [above sea level], 17 July 1962, coll. G. Carlsson; 1 larva (ZIN, slide 19340), Kol'skiy Peninsula, July 1967, coll. L.A. Chubareva.

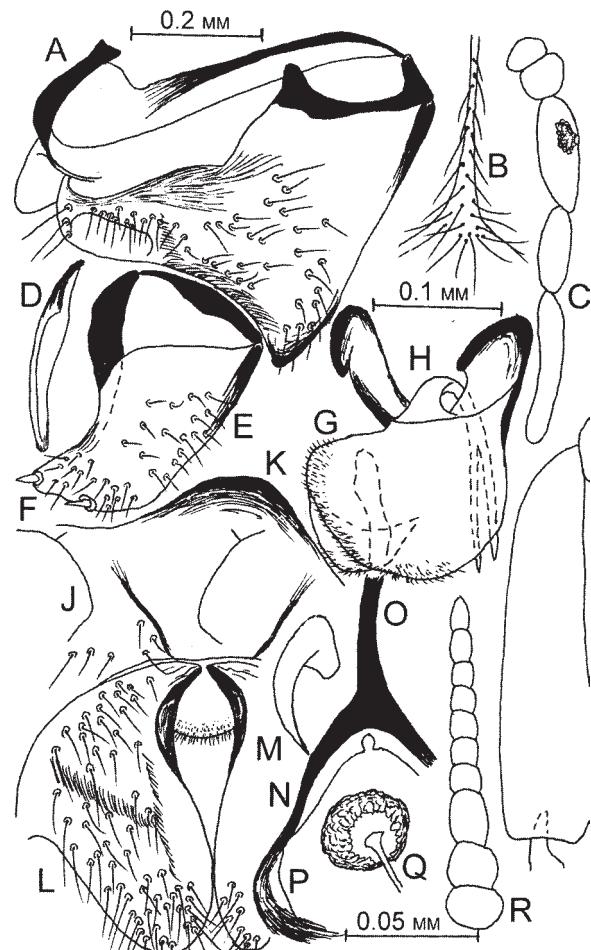
**Distribution.** Iceland, Norway (including Bear Island), Sweden, Finland, NW of European Russia, Greenland, Canada, USA (Alaska) (Crosskey and Howard 1997; Yankovsky 2002). Type locality: Bear Island.

**Remarks.** From 6 specimens deposited in the collection of ZIN, 4 specimens (3 specimens collected by G. Carlsson in Norway and 1 specimen collected by L.A. Chubareva in Kol'skiy Peninsula) undoubtedly belong to this species. Other 2 specimens in the collection (collected by Landa with not distinguishable data, probably from Norway) had been identified by Rubzov as *Prosimulium ?ursinum* (Rubzov earlier had the opportunity to compare these slides with the true *T. ursina* from Bear Island). According with their morphology (first of all, the morphology of the female, practically the same to the morphology of the females from Norway), in spite of the Rubzov's sign "?" these specimens are considered here as *Taeniopterna ursina*. Here is the very interest structure – larval anal sclerite consisting of 5 branches, the same shape of the larval anal sclerite we can see in the genus *Levitinia* Chubareva et Petrova 1981. This character connects *T. ursina* with the tribe *Gymnopaidini*, and in some way surmises the direction of evolution from the admitted archaic morphological scheme of the tribe *Prosimuliini* to the scheme of the tribe *Gymnopaidini*, firstly to the genus *Levitinia*, and allows to consider the genus *Taeniopterna* as a possible intermediate link.

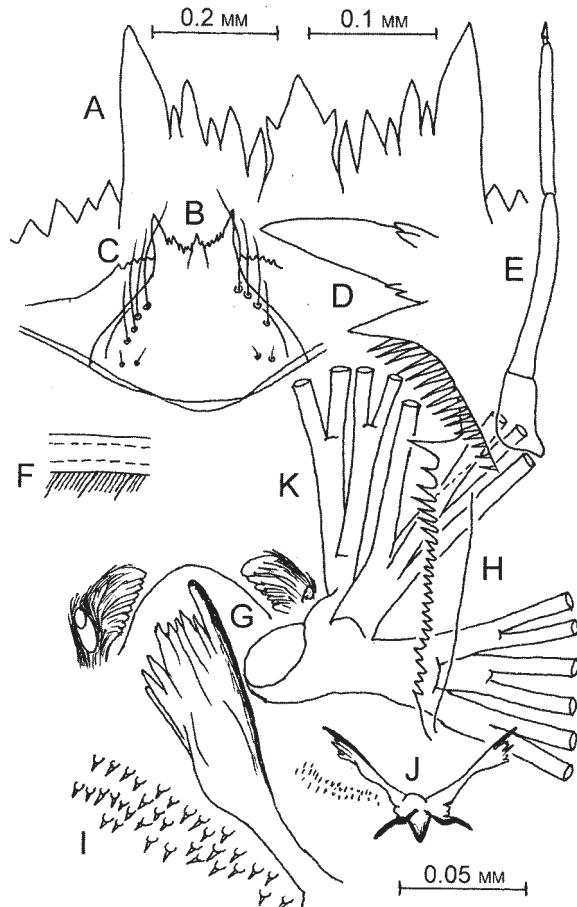
### 11. *Taeniopterna ventosa* (Rubzov, 1956) stat. n. (Figs. 20, 21)

*Prosimulium macropyga ventosum* Rubzov, 1956: 226, fig. 58; 1960: 160, fig. 56.

**Description.** *Male* (first description). Length 3.5–4.0 mm. Antennae of 11 articles (while in female of 10 articles). Antennae and maxillary palpi brown. Frons relatively (for males) wide, with long black hairs. Legs brownish black. Hind basitarsus moderately widened, 4.2 times as long as wide. Gonocoxites slightly longer than gonostyli, 1.3–1.4 times as wide



**Fig. 20.** *Taeniopterna ventosa* (Rubzov, 1956). Male (A–I): A – gonocoxite; B – frons; C – maxillary palp; D – paramere; E – gonostylus; F – apical spines on gonostylus; G – ventral plate; H – median sclerite; I – hind basitarsus. Female (J–R): J – frons; K – abdominal sternite VIII; L – hypogynal valve; M – claw; N – genital fork; O – stem of genital fork; P – posterior cleft of genital fork; Q – spermatheca; R – antenna. Scale bar: 0.2 mm = B, C, I, J, K, L, O, P, Q; 0.1 mm = A, D, E, F, G, H; 0.05 mm = M.



**Fig. 21.** *Taeniopterna ventosa* (Rubzov, 1956). Larva (holotype) (A–J): A – hypostomal teeth; B – hypostoma; C – sublateral setae on hypostoma; D – mandibular teeth; E – antenna; F – microtrichiae on rays of primary fan of premandibles; G – postgenal cleft; H – mandibular serration; I – thornlets near anal sclerite; J – anal sclerite. Pupa: K – basal part of gill. Scale bar: 0.2 mm = B, C, G, J, K; 0.1 mm = E; 0.05 mm = A, D, F, H, I.

as long, widened in basal part. Gonostyli subtriangular, weakly narrowed but curved distally, width at base 1.6 times width in distal part (ventral view), in ventral view 1.6 times as long as wide at base, apical spines 2. Body of ventral plate with distinctly developed median keel, arms short and widened, not curved backwards, heavily sclerotized. Gonopleurites as marrow elongated plates without projection. Median sclerite moderately widened in basal part, elongated and curved backward, distally very deeply bifurcated, branches tapered.

**Female** (first description). Length about 5 mm. Antennae of 10 articles. Antennae and maxillary palpi yellowish brown. Frons very wide, its least width 1.5 times more than height, with rare short sublateral hairs and without submedian hairs. Mouthparts not of bloodsucking type. Abdomen brownish black, legs brown. Fore basitarsus 7–8 times as long as wide. Claws toothless. Hypogynal valves 1.7 times as long as wide in middle part, 1.6–1.7 times as long as sclerotized sternite VIII, narrowed but rounded distally, closely spaced (maximal distance between valves about  $\frac{1}{3}$  width of valve in middle part), with large dense robust hairs; anteromedial angles of valves moderately sclerotized. Stem of genital fork strongly sclerotized, not widened apically, 1.4 times as long as branches; branches distinctly sclerotized, not widened in distal part, posteromedial apodemes very small, tapered, disposed near beginning of branches; posterior cleft of genital fork (between branches) moderately wide (width subequal to length). Anal lobes 1.5 times as long as cerci. Spermatheca 1.3 times as wide as long,  $\frac{1}{3}$  of length of branch of genital fork.

**Larva.** [Length 7–8 mm (Rubzov 1956: 226; 1960: 160)]. Head capsule light yellow, head pattern light brown, not distinct. Antennae thin, 1.5 times as short as stalks of premandibles, articles I+II 1.8 times as long as article III, article I 2.5 times as short as article II, article II without additional wrinkles. Primary fan of premandibles with 26–28 rays, secondary fan with 18–20, median fan with 16–18 rays; primary fan rays with microtrichia of 2 types: long ( $\frac{2}{3}$  as long as diameter of ray in middle part), and short ( $\frac{1}{2}$  as long as diameter of ray). Lateral hypostomal teeth 1.5 times as long as median tooth, lateral teeth IV longer than III; each side of hypostoma with 4 sublateral setae. Postgenal cleft with rounded anterior edge, not covered with membrane, postgenal bridge about equal in length to hypostoma. Outer teeth of mandibles unusual small and short, about similar in size with preapical teeth I, II; preapical tooth III 3 times as short as apical tooth and several times as long as very small preapical teeth I, II; inner mandibular teeth 15–16; mandibular serration of 23–25 conical notches arranged in simple line, first notch larger than others. Anal sclerite of peculiar shape, as in the genus *Levitinia* Chubareva et Petrova, 1981 and as in *Taeniopterna ursina* – it consists of 5 branches, upper branches 4 times as long as lower and median branches; posteriorly of each of upper branches 35–40 relatively large simple thornlets of peculiar shape

(see drawing), arranged downward. Posterior circlet of 80–84 rows with 12–13 hooklets in each row, lower branches of anal sclerite extend as far as row V.

**Pupa.** Gills light brown, less than  $\frac{1}{2}$  of pupal body length, of 14 filaments approximately equal in diameter and length, filaments disposed on 3 stems, scheme of divergence (2+2)+4+(2+2+2); angle between basal parts of upper and lower filaments about  $120^\circ$ . Cocoon covers about  $\frac{2}{3}$  of pupal body.

**Holotype.** Larva (ZIN, slide 2589), [East Siberia, ?Irkutsk Province], Spuskovaya River, 16 July 1931, coll. V.Ch. Dorogostayskiy.

**Paratypes.** 2 larvae (ZIN, slides 2590, 2591), same data.

**Additional material.** 1 larva with pupal gill histoblasts (ZIN, slide 2550), 3 larvae (ZIN, slides 2549, 2583, 2584), East Siberia, 1933, coll. I.A. Rubzov; 1 female with pupal exuviae (ZIN, slide 12155), 1 male with pupal exuviae (ZIN, slide 12159), 1 larva with pupal gill histoblasts (ZIN, slide 12160), Perm' Territory, affluent of Vil'va River, 20 July 1959, coll. K.N. Beltukova.

**Distribution.** E Siberia (Baikal Region) (Crosskey and Howard 1997; Yankovsky 2002).

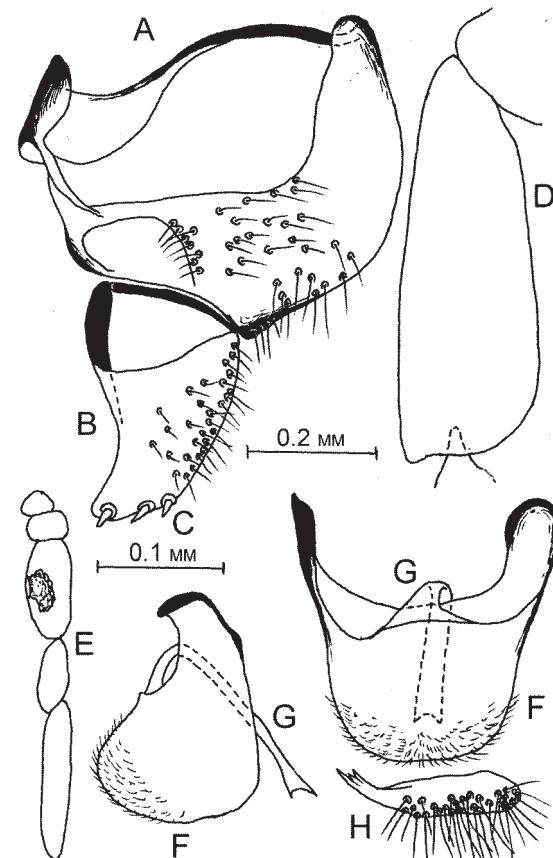
**Remarks.** In the collection of ZIN all the specimens of the type material ever signed by I.A. Rubzov as *Prosimulium ventosum*, never as a subspecies of *macropyga* as in the first description (Rubzov 1956: 226). It confirms my consideration of *Taeniopterna ventosa* as a separate species, all the more that the morphological differences between *T. macropyga* s.str. and *T. ventosa* are quite distinct. The male and female of *T. ventosa* have been collected only in 1959 (K.N. Beltukova) and had not been known in 1956 (thus they are absent in the original description and never were described later). The color of imago is generally dark, but the details are unknown, because both the males and the females had been extracted from the pupae. The development of the 5-branched anal sclerite of the larva, same in the shape to this structure in *T. ursina* and in the genus *Levitinia* Chubareva et Petrova, 1981, supposes the evolutionary propositions, given above in the remarks to *T. ursina*. The antennae of 10 articles, as in *T. ventosa*, have only the females of the subfamily *Parasimuliinae* Smart, 1945, and the females of 1 species of the genus *Parahelodon* Peterson, 1970, 2 species of the genus *Prosimulium* Roubaud, 1906 and some species of the genus *Greniera* Doby et David, 1959.

## 12. *Taeniopterna zaitzevi* (Rubzov, 1956)

(Fig. 22)

*Prosimulium macropyga zaitzevi* Rubzov, 1956: 226, fig. 57; 1960: 159, fig. 55.

**Description. Male.** Antennae and maxillary palpi black. Frons with short black hairs. Scutum mat black, with short rare golden hairs. Abdomen black, dorsally and ventrally with short golden hairs. Halteres brown. Legs brownish black. Hind basitarsus distinctly widened, 2.8 times as long as wide. Gonocoxites 1.3 times as long as gonostyli, distinctly widened in basal part, 1.3 times as wide as long. Gonostyli subtriangular, slightly narrowed distally (width at base twice more than width in distal part), in ventral view 1.5 times as long as wide at base, apical spines 3. Body of ventral plate flattened (length about equal to



**Fig. 22.** *Taeniopterna zaitzevi* (Rubzov, 1956). Male (holotype): A – gonocoxite; B – gonostylus; C – apical spines on gonostylus; D – hind basitarsus; E – maxillary palp; F – ventral plate; G – median sclerite; H – cercus. Scale bar: 0.2 mm = D, E; 0.1 mm = A, B, C, F, G, H.

width), without distinct median keel, arms short and widened, not curved backwards, weakly sclerotized. Gonopleurites as simple elongated plates without projection. Cerci elongated, without sclerotized part and with 25–30 long setae in distal part. Median sclerite very long and narrow, basally moderately widened and distally almost not bifurcated.

*Female, larva and pupa* unknown.

**Holotype.** Male (ZIN, slide 3902, only genitalia), [West Siberia], Tobol'sk Gubernia [Tyumen' Province], Karskaya Tundra, Pemal, 4 July 1909, coll. F. Zaytsev.

**Paratypes.** 1 male (ZIN, slide 3025, genitalia in slide 3030), same data, 1 male (pinned), same data.

**Distribution.** W Siberia (Ob' River Basin) (Crosskey and Howard 1997; Yankovsky 2002).

**Remarks.** The female of this species is unknown in spite of the label of I.A. Rubzov dated 1957 (see above the remarks to *T. tiksi*). *T. zaitzevi* had been described as the subspecies of the species *T. macropyga* (Lundström, 1911) (Rubzov 1956), but the differences in morphology between the former subspecies *T. macropyga zaitzevi* and the species *T. macropyga* s.str. not lesser than the differences between all the other species of the genus *Taeniopterna*, and so *T. zaitzevi* was treated as the separate species (Yankovsky 2002).

#### Key to species of the genus *Taeniopterna* Enderlein, 1925

**Males** (males of parthenogenetic *T. ursina* (Edwards, 1935) do not exist; males of *T. arctica* (Rubzov et Carlsson, 1965), *T. pamirica* (Chubareva et Petrova, 1983) and *T. tredecimfistulata* (Rubzov, 1956) unknown)

1. Gonostyli with 3 apical spines ..... 2
- Gonostyli with 2 apical spines ..... 3
2. Hind basitarsus moderately widened, 4.0–4.5 times as long as wide, gonocoxites 1.8 times as long as gonostyli ..... *T. tiksi* Yankovsky sp.n.
- Hind basitarsus distinctly widened, 2.8 times as long as wide, gonocoxites 1.3 times as long as gonostyli ..... *T. zaitzevi* (Rubzov, 1956)
3. Length of gonocoxites markedly more than width; gonostyli distinctly narrowed distally, width at base 4 times width in distal part (ventral view) ..... *T. erythronota* (Rubzov, 1956)
- Length of gonocoxites markedly less than width; gonostyli moderately or weakly narrowed distally, width at base 1.6–2.5 times width in distal part (ventral view) .. 4
4. Arms of ventral plate very long, curved backwards ... 5
- Arms of ventral plate short, not curved backwards ... 6

5. Gonocoxites 1.3 times as long as gonostyli; body of ventral plate 1.7 times as wide as long; Palaearctic ..... *T. macropyga* (Lundström, 1911)
- Gonocoxites 1.5 times as long as gonostyli; body of ventral plate twice as wide as long; Nearctic ..... *T. neomacropyga* (Peterson, 1970)
6. Hind basitarsus distinctly widened, 2.7–2.8 times as long as wide ..... 7
- Hind basitarsus moderately widened, 4.0–4.5 times as long as wide ..... 8
7. Gonocoxites about twice as long as gonostyli; length of gonostyli 1.2 times less than width at base; gonopleurites as thin curved tapered elongate plates ..... *T. kolymensis* (Patrusheva, 1975)
- Gonocoxites 1.5 times as long as gonostyli; length of gonostyli 1.3 times more than width at base; gonopleurites as subrectangular relatively wide elongate plates. .... *T. korshunovi* (Patrusheva, 1975)
8. Gonocoxites distinctly widened in basal part; gonostyli distinctly narrowed distally, width at base 2.5 times width in distal part; gonopleurites with triangular heavily sclerotized projection ..... *T. nenetz* Yankovsky sp.n.
- Gonocoxites almost not widened in basal part; gonostyli weakly narrowed distally, width at base 1.6 times width in distal part; gonopleurites without projection .. *T. ventosa* (Rubzov, 1956)

**Females** (females of *T. arctica* (Rubzov et Carlsson, 1965), *T. nenetz* Yankovsky sp.n., *T. pamirica* (Chubareva et Petrova, 1983), *T. tredecimfistulata* (Rubzov, 1956) and *T. zaitzevi* (Rubzov, 1956) unknown)

1. Mouthparts haematophagous, mandibles and maxillar laciniae with distinct teeth ..... *T. erythronota* (Rubzov, 1956)
- Mouthparts not haematophagous, mandibles and maxillar laciniae without distinct teeth ..... 2
2. Antennae of 10 articles ..... *T. ventosa* (Rubzov, 1956)
- Antennae of 11 articles ..... 3
3. Claws toothless; posterior blade of anal lobes distinctly elongated as narrow projection .. *T. tiksi* Yankovsky sp.n.
- Claws with small, but well distinguishable basal tooth; posterior blade of anal lobes not elongated as narrow projection ..... 4
4. Branches of genital fork with right-angled thin membranous posteromedial apodemes ..... 5
- Branches of genital fork without large membranous parts, posteromedial apodemes very small, tapered, disposed near beginning of branches ..... 6
5. Maxillar palpomere V about equal in length to palpomeres III+IV; membranous posteromedial apodemes closely spaced, posterior cleft of genital fork (between apodemes) as narrow chink; anal lobes twice as high as long, posterior blade of anal lobes with 15–17 small spiniform setae ..... *T. korshunovi* (Patrusheva, 1975)

– Maxillar palpomere V 1.3–1.4 times as short as palpomeres III+IV; membranous posteromedial apodemes widely spaced; posterior cleft of genital fork (between apodemes) of moderate width (depth 1.5 width); anal lobes 1.2 times as high as long, posterior blade of anal lobes with 25–30 small spiniform setae ..... 5  
*T. kolymensis* (Patrusheva, 1975)

6. Maxillar palpomere V slightly longer than palpomeres III+IV; hypogynal valves twice as long as abdominal sternite VIII; anal lobes 1.4 times as high as long; Holarctic ..... 6  
*T. ursina* (Edwards, 1935)

– Maxillar palpomere V 1.5 times as short as palpomeres III+IV; hypogynal valves equal or 1.5 times as long as abdominal sternite VIII; anal lobes 2.5 times as high as long; only Palaearctic or only Nearctic ..... 7

7. Body length 3.5–5.0 mm; hypogynal valves 1.5 times as long as abdominal sternite VIII; stem of genital fork curved and widened distally, approximately equal in length or slightly longer than branches; spermatheca rounded ..... 7  
*T. macropyga* (Lundström, 1911)

– Body length 2.6–3.5 mm; hypogynal valves equal in length to abdominal sternite VIII; stem of genital fork not curved and not widened distally, 1.5 times as long as branches; spermatheca 1.5 times as wide as long ..... 7  
*T. neomacropyga* (Peterson, 1970)

**Larvae** (larvae of *T. erythronota* (Rubzov, 1956), *T. nenetzi* Yankovsky sp.n., *T. tiksi* Yankovsky sp.n., and *T. zaitzevi* (Rubzov, 1956) unknown)

1. Anal sclerite of 5 branches ..... 2
- Anal sclerite of 4 branches ..... 3
2. Each side of hypostoma with 3–4 sublateral setae; mandibular serration of 21–22 notches, arranged into 2 groups (7 anterior and 14–15 posterior); posterior circlet of 66–78 rows of hooklets ..... 2  
*T. ursina* (Edwards, 1935)
- Each side of hypostoma with 4–6 sublateral setae; mandibular serration of 24–25 notches, arranged in simple line; posterior circlet of 80–84 rows of hooklets ..... 3  
*T. ventosa* (Rubzov, 1956)
3. Article II of antennae with distinct additional wrinkles; primary fan of premandibles with 13–15 rough rays; mandibles with distinct additional third outer tooth arranged inward; posterior circlet of 96–98 rows ..... 3  
*T. pamirica* (Chubareva et Petrova, 1983)
- Article II of antennae without wrinkles; primary fan of premandibles with 22–33 relatively thin rays; mandibles without additional outer tooth; posterior circlet of 64–88 rows ..... 4
4. Antennae subequal or slightly longer than stalks of premandibles; lateral hypostomal teeth IV shorter than III ..... 4  
*T. kolymensis* (Patrusheva, 1975)
- Antennae markedly shorter ( $\frac{1}{3}$ – $\frac{1}{2}$ ) than stalks of premandibles; lateral hypostomal teeth IV longer than III ..... 5

5. Mandibular serration of 2 distinct groups – several relatively large notches arranged rather forward and other notches not arranged forward; posterior circlet of 88 rows ..... 5  
*T. arctica* (Rubzov et Carlsson, 1965)

– Notches of mandibular serration arranged in simple line; posterior circlet of 66–78 rows ..... 6

6. Each side of hypostoma with 7–8 sublateral setae ..... 6  
*T. tredecimfistulata* (Rubzov, 1956)

– Each side of hypostoma with 4–5 sublateral setae ..... 7

7. Antennae very short, less than  $\frac{1}{3}$  of length of stalks of premandibles, articles I+II equal in length to article III, article I equal in length to article II ..... 7  
*T. macropyga* (Lundström, 1911)

– Antennae longer,  $\frac{1}{2}$  of length of stalks of premandibles, articles I+II 1.6–2.3 times as long as article III, article I not equal in length to article II ..... 8

8. Articles I+II of antennae 1.6 times as long as article III, article I 3 times as short as article II; primary fan of premandibles with 24–29 rays ..... 8  
*T. neomacropyga* (Peterson, 1970)

– Articles I+II of antennae 2.3 times as long as article III, article I 1.4 times as long as article II; primary fan of premandibles with 27–33 rays ..... 8  
*T. korshunovi* (Patrusheva, 1975)

**Pupae** (pupae of *T. nenetzi* Yankovsky sp.n., *T. tiksi* Yankovsky, sp.n., and *T. zaitzevi* (Rubzov, 1956) unknown)

1. Gills of 12 filaments ..... 1  
*T. tredecimfistulata* (Rubzov, 1956)
- Gills of 14–16 filaments ..... 2
2. Gills of 16 filaments ..... 3
- Gills of 14 filaments ..... 4
3. Filaments disposed on 8 short stems (stems 2–3 times as long as diameter), angle between basal parts of upper and lower filaments about 90° ..... 3  
*T. arctica* (Rubzov et Carlsson, 1965)
- Filaments disposed compactly on 2 very short thick stems, angle between basal parts of upper and lower filaments about 120° ..... 4  
*T. pamirica* (Chubareva et Petrova, 1983)
4. Angle between basal parts of upper and lower filaments about 180° and more ..... 5
- Angle between basal parts of upper and lower filaments 45–120° ..... 6
5. Filaments weakly curved and widely spaced in distal part, disposed on 5 short stems, scheme of divergence 2+2+2+4+(2+2); Palaearctic ..... 5  
*T. erythronota* (Rubzov, 1956)
- Filaments distinctly curved and draw together in distal part, disposed on 3 short stems, scheme of divergence (2+2+2)+4+(2+2); Nearctic ..... 6  
*T. neomacropyga* (Peterson, 1970)
6. Filaments disposed on 4 short thick stems, scheme of divergence 4+2+2+(4+2); angle between basal parts of upper and lower filaments 60° ..... 6  
*T. macropyga* (Lundström, 1911)

- Filaments disposed on 3 short stems; angle between basal parts of upper and lower filaments 45–120° ..... 7
- 7. Angle between basal parts of upper and lower filaments 120° or slightly more ..... *T. ventosa* (Rubzov, 1956)
- Angle between basal parts of upper and lower filaments 45–90° ..... 8
- 8. 4–5 of lower filaments  $\frac{1}{3}$  as short as others, 2 upper filaments in  $\frac{1}{3}$  of length from base distinctly curved ..... *T. kolymensis* (Patrusheva, 1975)
- All filaments about equal in length, 2 upper filaments not curved ..... 9
- 9. Gills yellow,  $\frac{1}{2}$  of pupal body length; angle between basal parts of upper and lower filaments about 90°; only Palaearctic ..... *T. korshunovi* (Patrusheva, 1975)
- Gills dark brown,  $\frac{1}{2}$  of pupal body length; angle between basal parts of upper and lower filaments in Palaearctic species about 45°; Holarctic ..... *T. ursina* (Edwards, 1935)

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